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FORWARD

The purpose of the Faculty Research Journal is:

(1) to encourage research and scholarly activity by the faculty and

(2) to provide a point of contact by which our academic community and other interested persons can communicate on relevant topics in the setting of Christian education.

The current issue contains manuscripts in various areas of instruction at Oakwood College. The editors and authors encourage comments.

A special thanks goes to our secretarial coordinator, Andrea Jeries.

05-08-90

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CONTENTS

CRITICAL DIMENSIONS IN EVALUATING ENTHUSIASTIC TEACHER BEHAVIOR
Jeannette R. Dulan, M.Ed., Assistant Professor of Education . . 1

TEACHING POETRY CAN BE A JOY
Frances Mouzon, Associate Professor of English 21

LACTATE DEHYDROGENASE ACTIVITY IN BENZOYL PEROXIDE INDUCED PLATELET AGGREGATION
Ephraim Gwebu, Ph.D., Associate Professor of Chemistry . . . 30

EFFECT OF DDT ON HUMAN BLOOD PLATELET AGGREGATION
Ephraim Gwebu, Ph.D., Associate Professor of Chemistry . . . 36

A TEACHING MODEL FOR ASSIGNING QUANTUM NUMBERS TO ELECTRONS
E. A. Cooper, Ph.D., Professor of Chemistry; Department Chair 40

STUDY OF THE PICARDY THIRD AS IT WAS USED FROM THE LATE SIXTEENTH CENTURY THROUGH THE MID-NINETEENTH CENTURY
Shirley Beary, D.M.A., Professor of Music 43

SOME ASPECTS OF THE PORTUGUESE CONQUEST OF ANGOLA
Emmanual Saunders, Ph.D., Professor of History 65

CRITICAL DIMENSIONS IN EVALUATING ENTHUSIASTIC TEACHER BEHAVIOR

Jeannette R. Dulan

ABSTRACT

Review of the literature on teacher enthusiasm revealed six low-inference behavioral components of enthusiasm that reflect a balance of cognitive and affective teacher behaviors: physical movement, facial expression, vocal delivery, personalizing information, presenting tasks as positive challenges, and praise. these indicators were used to observe student teacher enthusiastic behavior. Interrater agreement was assessed and a median reliability coefficient of 86.6 was attained.

Enthusiasm is generally considered a desirable characteristic of effective teacher behavior (Burts, 1985, Rosenshine & Furst, 1971). Researchers have reported that enthusiasm is positively linked to achievement, attitude (Larkins & McKinney, 1982; Mastin, 1963), motivation (Burts, McKinney, & Burts, 1985), and preference for one teacher over another (Costin, Greenough, & Menges, 1971: McKinney & Larkins, 1982). Experts in teacher education, such as Good and Brophy (1984) exhort teachers to be enthusiastic. They suggest that enthusiasm is important for meeting educational goals and maintaining student interest.

General Definitional Problems

Although teacher enthusiasm has consistently been identified as an important teacher characteristic, one of the problems researchers encounter when studying enthusiasm is the lack of a commonly accepted definition (Caruso, 1982). The literature contains two principal types of definitions and their related varieties. One is based on levels of inference (Rosenshine, 1970), the other on presence of observable behaviors (Caruso, 1980).

Rosenshine (1970) defines inference as the process of intervening between the objective data seen or heard and the judgment made concerning cognitive or social interaction. He identified two levels of inference, high and low. High-inference indicators (e.g. exuberant, vibrant, exciting) require subjective interpretation. Rosenshine and Furst (1971) suggest that high

inference descriptors are useful in processing a large number of cues before making decisions. Low-inference descriptors (e.g. nodding, pointing, praising) require very little subjective interpretation (Caruso, 1982). Additionally, low-inference descriptors provide specific details on behaviors which might escape an investigator limited to high inference descriptions (Rosenshine & Furst, 1971).

The second approach to classifying definitions of enthusiasm is based on the presence of absence of observable behaviors. Indicators of teacher enthusiasm in this category can be identified as behavioral or nonbehavioral (Caruso, 1980). Caruso (1980) defines behavioral descriptors of teacher enthusiasm as "specific, discrete, observable actions" (e.g. movement, praise) Conversely, nonbehavioral descriptors include words or phrases which have abstract qualities that must be subjectively interpreted by observers. (e.g. exuberant, vibrant) Most researchers have a mix of behavioral descriptors in studies of teacher enthusiasm. Consequently, subjective interpretation is involved that results in an unknown degree of contamination (Caruso, 1980).

Behavioral descriptors provide a means of objectively describing components of teacher enthusiasm. However, Caruso (1980) points out that even behavioral descriptors may require observers to use a high or low level of inference depending on the specificity of the descriptors. For example, "movement" is an observable teacher action. Movement versus low inference observations; moving rapidly versus moving slowly requires moderate inference; and moving at an inappropriate speed versus moving at an appropriate speed requires high inference.

The enthusiastic behaviors identified in the literature reveal a wide range of opinion about what indicators should be included. For example, Caruso (1982) confined her description of enthusiastic behaviors for physical education teachers to participation, encouragement, and praise. Good and Brophy (1984, p. 341-342) have identified alertness, vigor, interest, movement, and voice inflection as qualities of enthusiasm. Additionally, they have identified the following behaviors as indicative of enthusiasm during the teaching process: challenging students to test themselves in problem solving and skill development, presenting tasks as positive challenges rather than unwelcomed chores, and personalizing information by relating it to students' needs and interests.

Definitional Problems Related to Measurement

More recent research indicates that there is an overlap of descriptors used by investigators conducting empirical studies. Secondly, several researchers have selected common measures of enthusiasm, enabling them to replicate and extend knowledge of its effect in teacher training and student outcomes. Finally, measures of enthusiasm used in empirical studies place a heavy

emphasis on affective dimensions of enthusiasm (i.e. expressive behaviors such as gestures and facial expressions). Little attention is given to cognitive dimensions of the construct (i.e. classroom instructional behaviors such as praise and personalizing information).

Researchers have commonly included indices of physical movement, facial expression, vocal delivery, and overall energy level to describe teacher enthusiasm (e.g. Larkins and McKinney, 1982; Collins, 1978).

Larkins and McKinney (1982) used hand gestures, facial expressions, flamboyance, stops or breaks in the lesson, and teacher commitment to the subject being taught as indices of enthusiastic behavior during seventh-grade social studies instruction. They reported results from two studies to determine whether three levels of teacher enthusiasm would produce corresponding differences in social studies achievement and students' attitudes toward instruction and teacher behavior. Treatments (i.e. high, normal, and low levels of enthusiastic behavior) were administered over four days in a counterbalanced design to intact classes. Results of study one indicated no significant differences between low and normally taught groups. A replication of study one using tighter controls and random assignment of students resulted in significant differences in student attitude and achievement between low (lethargic) and normal, as well as low and enthusiastic levels. However, no significant differences were noted in attitude and achievement between normal and enthusiastic treatments.

Perhaps the most commonly used descriptors of enthusiasm in recent research were identified by Collins (1978) and used in training preservice teachers. Eight descriptors of enthusiasm were derived from the following sources: studies on teacher enthusiasm as reported by Rosenshine (1970), observations, results of a pilot study, and opinions of five experts in the area of teacher education. The descriptors used to measure enthusiasm were: vocal delivery, eye contact and expressions, gestures, movement, facial expression, word selection, acceptance of ideas and feelings, and overall energy (See Appendix A).

Results of the training indicated a significant increase in the level of enthusiasm for the experimental group between the pretest and post test. Additionally, results of a follow-up post test administered three weeks later indicated increased levels of enthusiasm were maintained. There were no significant differences in the control group among the three tests.

Bettencourt (1983); Burts, McKinney, and Burts (1985); Gillet (1980); and McKinney, Larkins, Kazelskis, Ford, Allen and Davis (1983) used Collins' (1978) descriptors in measuring enthusiastic teacher behaviors. With the exception of "acceptance of students' ideas and feelings" and "word selection" McKinney, Larkins, and Burts (1984) used Collins' descriptors in their study of teacher enthusiasm.

Several conclusions can be drawn from the studies cited. It is clear that teachers can be trained to increase their levels of enthusiasm as well as differentiate between low, medium, and high levels of the construct. Notably, Bettencourt (1983) and Gillet (1980) were able to replicate Collins' findings in training teachers to increase their levels of enthusiasm. Secondly, student gains in on-task behavior has been related to teacher enthusiasm (Bettencourt, 1983; Burts et al., 1985; Gillet, 1980). Finally, it appears that teacher enthusiasm and student achievement are related for upper elementary and junior high students, however, there appears to be no significant relationship for younger students.

Selection of Enthusiasm Indicators

An analysis of the descriptors used in each of the studies cited indicates that the focus in on the affective indices of enthusiasm while little attention is given to the cognitive categories. McNeil and Popham (1973) recommend a balance in the cognitive and affective descriptors used in classroom observation systems, especially in assessing teacher behaviors.

The affective indices of enthusiasm are concerned primarily with expressive behaviors much as movement, gestures, vocal delivery, and facial expressions. Cognitive indices focus on behaviors individuals use during classroom instruction such as "presenting tasks as positive challenges rather than unwelcomed chores." Expressive indices (affective), used in measuring enthusiasm, have a generic application to various social interactions that include teaching but also apply to activities such as public speaking and sales. Instructional indices (cognitive) focus on behavior during the process of teaching. Good and Brophy (1984) and McNeil and Popham (1973) suggest that valid measures of teacher enthusiasm include affective and cognitive indices.

Collins (1978) has made the most noted attempt in recent literature to identify indicators of teacher enthusiasm. Research using indices as a measure of enthusiasm have resulted is some integration and replication of studies. Her contribution has had a positive influence on the utility of empirical research. However, there are two concerns that arise from her list of descriptors. One concern is the need for more attention to behaviors which individuals use during classroom instruction (cognitive indices). Collins' (1978) list appears to be a partial representation of teacher enthusiasm descriptors in that there is an underrepresentation of cognitive indices. Seven of the eight descriptors (88%) represent generic affective indices of the construct, while only one seems to represent a cognitive indice (i.e. acceptance of ideas and feelings).

A second concern relates to the need for low-inference behavioral measures of teacher enthusiasm. Rosenshine (1970) has cautioned that low inference indicators are of greater utility to

teacher educators in that the variables are easier to translate into specific behaviors. Further, Caruso (1980) and McNeil and Popham (1973) have emphasized the need for behavioral rather than nonbehavioral measures. Collins' (1978) list of descriptors includes both high and low inference behaviors (e.g. overall energy level, eyes opened wide) as well as a mix of behavioral descriptors such as _swung around_, _walked rapidly_, and _changed pace_, but also included non-behavioral descriptors such as _unpredictable_ or _energetic_ (Caruso, 1980).

These concerns may reflect an unexplored explanation for the differential effects of enthusiasm on grade level observed in recent research (See Burts, et. al., 1985; McKinney, et al., 1983). It appears that teacher enthusiasm has a positive effect on achievement when subjects are upper elementary or junior high students. Investigators suggest possible explanations for these findings. (a) One explanation is that teacher enthusiasm is less important for younger children than for older children. The apparent difference is attributed to the school socialization process. This process suggest that younger children "accept without much questioning" the teacher and the school curriculum. Consequently, teachers do not need to "prove" themselves the way teachers working with older students do (Brophy & Everston, 1976, p. 106). (b) McKinney, et al. (1983) offer another explanation for differential effects of enthusiastic teacher behavior based on the developmental needs of young vs. adolescent students. They suggest that high enthusiasm will overstimulate young children and create problems in classroom management. Evidence supporting this assumption is indicated in the results reported by McKinney, Larkins and Burt (1984). It appears that high levels of teacher enthusiasm had a negative effect on achievement of young students (c) Finally, an explanation that investigators have not discussed is the imbalance of measures used in empirical studies. The heavy emphasis on affective dimensions of enthusiasm may not be a valid sampling of enthusiastic _classroom_ teaching behaviors. There have been few, if any, cognitive indices included among the descriptors of enthusiasm used in recent research with elementary grade children.

Rationale and Purpose

Teacher educators are under increasing pressure to better prepare candidates to function as effective teachers (Kingen, 1984). Valid measures of teacher enthusiasm would contribute to this need.

This study is designed to address the issue of an appropriate balance of expressive and instructive low inference indices of enthusiasm as well as interrater reliability in assessing enthusiastic teacher. For the purpose of this study enthusiasm is conceptualized as teacher behavior that demonstrates positive, adherent interest towards the student, the subject matter, and the learning process. If valid measures of teacher enthusiasm are to be obtained the selection of appropriate indices and the instruments reliability are paramount concerns.

To address these concerns the study focuses on two specific issues:

1. Identify appropriate affective and cognitive low inference indicators of enthusiasm that can be used to measure enthusiastic behaviors related to classroom teaching.
2. Establish interrater reliability of the selected enthusiasm indices.

METHOD

Subjects and Settings

The original population for this study was 31 preservice elementary and special education teachers enrolled in student teaching and a teaching practicum during the Spring semester at a southern University.

Data for three of the students was not usable because of appropriate settings or teacher absence. Thus, twenty-eight students participated in the study. Fifteen of the students were enrolled in a baccalaureate degree program in Elementary Education, and 9 were enrolled in a Special Education program. Four students were enrolled in a masters level practicum course in Special Education. Twenty-seven of the students had no previous teaching experience, one had less that 1 year of teaching experience.

The participating students were assigned to 9 elementary city schools and an Experimental School located on the University campus. They were actively teaching in each of their assigned classes. Each student was located in a different classroom with a cooperating teacher for that class. Supervisors were six doctoral level students from the University assigned to monitor and evaluate student teacher progress. The supervisor is responsible for the student conducting the evaluations.

MEASURES

Indices of enthusiastic behaviors selected for this study are referred to as the Teacher Enthusiasm Measures (TEM). The TEM was developed by the investigator for this project. (See Appendix B for the rationale for indice selection (See Appendix C for instructions and definitions). Six low inference indicators of enthusiasm were derived from teacher enthusiasm literature as reported by Collins (1978), Caruso (1982), Rosenshine (1970), Good and Brophy (1984), and the opinions of two experts in the field of teacher education. The important features of the instrument are: a) the specificity in dealing with measurable, observable behaviors, b) a categorical recording system that identifies the occurrence and nonoccurrence of the behaviors in specified time intervals, and c) indices that reflect a balance

of affective (expressive) and cognitive (instructional) enthusiasm behaviors. The merit of these indicators has not yet been investigated.

Teacher Enthusiasm Measures. Behaviors used to measure teacher enthusiasm consisted of the following indicators:

1. **Physical Movement.** Moves arms out toward person or object, points, nods head up and down, walks from one point to another.
2. **Facial Expression.** Opens eyes wide (eye brows raised) then returns them to normal position, changes position of the lips (e.g.) opens wide, smiles, frowns; not simply talking)
3. **Vocal Delivery.** Changes voice to higher or lower pitch than normal, increases volume or lowers it, increases speed or slows down.
4. **Personalizes Information.** Initiates, accepts or encourages responses and statements relating students' personal experiences to the concept under discussion.
5. **Presents Tasks as Positive Challenges.** Mentions content information or skills the student will learn during that lesson. (It is mentioned as a positive statement of assignment or instruction). Presents tasks and assignment without apology.
6. **Praise.** A positive statement that specifies the particular accomplishment being praised.

Procedures

The participating students were aware that they were being observed for general performance, but were not informed of the specific criterion as it related to enthusiastic performance. Supervisors were told that the purpose of the study was to establish interrater reliability of a measure of teacher enthusiastic behaviors. Enthusiasm data were collected as a part of the normal routine of supervision.

Supervisors recorded occurrence of enthusiastic behavior during three 15-minute portions of a group (three or more students) instructional session using interval recording with 10-second intervals for observation alternated with 5-second intervals recording. The observers wore an ear plug attached to a tape recorder which signaled intervals. Training was done in the classroom with each supervisor observing a student teacher for which she was responsible. The primary investigator functioned as the trainer and reliability checker. An acceptable level of agreement for the measure of enthusiastic teacher behavior was set at .75 (See Noll, Scannell, and Craig, 1979). Training continued until a minimum level of .75 interrater agreement was

achieved with each of the six observers. This criterion was achieved with all supervisors within 1-4 training sessions.

The point by point method was used to calculate interrater reliability. Percent agreement for occurrences and non occurrences was calculated by dividing the total number of agreements plus disagreements in each session and multiplying by 100. Interrater agreement was assessed during 26% of the total sessions. Data were collected over a period of 11 weeks during the Spring semester.

RESULTS

A median interrater reliability coefficient of 86.6 for overall enthusiasm was attained. Higher median interrater reliability was attained for expressive behaviors (affective) than for instructional behaviors (cognitive) they were 90.0 (range 43.3-100) and 83.3 (range 56.6-100) respectively. Interrater reliability for overall enthusiasm and enthusiasm indicators is presented in Table 1.

Table 1

Interrater Reliability for Teacher Enthusiasm Indicators

Enthusiasm Indicators	Interrater Reliability Median	Interrater Reliability Range
Physical movement	92.6	80.0- 100
Facial expression	86.6	43.3-96.6
Vocal delivery	88.3	63.3- 100
Personalizing Information	81.7	56.5- 100
Presenting Tasks	76.6	63.3- 100
Praise	86.6	73.3- 100
Overall enthusiasm	86.6	43.3- 100

Means and standard deviations for each enthusiasm indicator and for overall enthusiasm are presented in Table 2.

Table 2

Means and Standard Deviations of the Enthusiasm Scores

Enthusiasm Indicators	M	SD
Physical movement	76.25	18.65
Facial expression	57.38	24.96
Vocal Delivery	60.08	18.97
Personalizing information	36.67	15.46
Presenting tasks	43.67	16.35
Praise	20.92	10.05
Overall enthusiasm	49.76	11.62

DISCUSSION

The TEM presented in this paper is designed to be used by teacher trainers or evaluators familiar with the instructional unit being presented and instructional processes in the elementary classroom.

A median interrater reliability coefficient of 86.6 indicates an adequate level of agreement between observers. Both the expressive and instructional indices met the criterion for an adequate level of agreement. Training supervisors to observe indicators of enthusiasm within 1-4 sessions indicated the

An interesting finding regarding the low level of praise statements (M=20.92) provided information to both supervisors and student teachers. Prior to the use of the TEM both supervisors and student teachers were unaware of "missed" opportunities to praise student efforts. Supervisors were able to give direct feedback and instructional support to student teachers in guiding them in developing appropriate praise behavior.

It is important that research in effective instruction be implemented in classroom instructional processes. Implementation should include a variety of appropriate evaluative procedures, both global and discrete. Low-inference indicators and use of discrete measure allow more specific feedback to be given to the student teacher. While high-inference measures points out the need for development in this area.

Supervisors reported anecdotally to the investigator that use of the TEM provided important information in evaluating teacher performance that otherwise would have escaped their view. Further, they reported that interval recording was not obtrusive or aversive. Four of the six supervisors used the measures in the following academic term.

Though not reported in the findings supervisors also used a rating scale (see Appendix D) to evaluate the same teacher enthusiasm indicators used in the interval measures of the construction. Each supervisor used the rating scale with half her supervisors before collecting interval data. In cases where the supervisor observed one student they used the rating scale following the collection of interval data. While no specific training was given in the use of the rating scale for evaluating levels of enthusiasm, supervisors reported the usefulness of each form. They indicated a preference for the interval recording when seeking information for specific feedback regarding discrete behaviors in the context of formative evaluation. The rating scale, they reported, provided a global view appropriate for summative evaluation.

The merit of these indicators will need further investigation. Further, the question of a criterion for occurrence of the behavior being observed should be explored. For example, the amount of praise that is enough or too little could be studied. It is suggested that the measure may be modified to indicate the number of missed opportunities to exhibit the behavior.

Further research is needed in the area of enthusiastic teacher behaviors to validate indices of enthusiasm in the educative process. Specifically, there is a need to identify teacher enthusiasm behaviors associated with specific changes in learners at various age and grade levels.

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Appendix A

Collins' Descriptors for Teacher Enthusiasm

DESCRIPTORS USED BY COLLINS TO MEASURE HIGH TEACHER ENTHUSIASM[*]

1. **Vocal Delivery**--------great sudden changes from rapid, excited speech to a whisper, varied lilting, uplifting intonations, many changes in tone, pitch.

2. **Eyes**--------------------dancing, snapping, shining, lighting up, frequently opened wide, eyebrows raised, eye contact with total group.

3. **Gestures**----------------frequent demonstrataive movements of body, head, arms, hands and face, sweeping motions, clapping hands, head nodding rapidly.

4. **Movements**---------------large body movements, swings around, changes pace, bends body.

5. **Facial Expression**-----appears vibrant, demonstrative, changes denoting surprise, sadness, joy, thoughtfulness, awe, excitement.

6. **Word Selection**---------highly descriptive, many adjectives, great variety.

7. **Acceptance of Ideas and Feelings**----accepts ideas and feelings quickly with vigor and animation, ready to accept, praise, encourage or clarify in a non-threatening manner, many variations in responding to pupils.

8. **Overall Energy**---------explosive, exuberant, high degree of vitality, drive and spirit throughout lesson.

---

*(Collins, 1978)

Appendix B

Selection of Enthusiasm Indicators

RATIONALE FOR SELECTION OF TEM INDICATORS

(See "Enthusiasm Definitions for Interval Recording" for specific examples of indicators discussed below)

Physical Movement, Facial Expression, and Vocal Delivery, have been identified as indices of enthusiasm. (Collins, 1978) Movements, expressions, and vocal delivery variations that appropriately highlight salient information reduce the effects of competing stimuli that are irrelevant to the goals of instruction. Further, these teacher behaviors contribute to increased student attention and achievement (Orme, 1980).

Personalizing Information is the fourth indicator of enthusiasm in the TEM. Demonstrating to students how things you are talking about relate to their experiences is an element of "enthusiasm." Personalizing information helps students to realize that a basic purpose of school is to help them adapt to their environment. Additionally, personalizing information stimulates attention and achievement (Beiler, 1982). Presenting Tasks as Positive Challenges Rather Than Unwelcomed Chores is the fifth TEM indicator. This element of enthusiasm is indicated in teacher attitudes toward school learning. It involves the ability of the teacher to model behavior that is indicative of a positive attitude toward learning.

According to Good and Brophy (1984) teachers with positive attitudes see learning activities as an unpleasant but necessary drudgery. If they believe in a positive approach toward motivation they will be apologetic and defensive about assignments and inappropriately overemphasize external incentives such as contest and rewards. "If they are more authoritarian and punitive they will present assignments as bitter pills that students must swallow or else." These behaviors indicate that the teacher does not see school activities as very interesting or pleasant. Thus, enthusiasm is not likely to be projected.

Specific Praise is the final indicator of enthusiasm included in the TEM. Sultzer-Azaroff and Mayer (1977) define positive reinforcement as a procedure that maintains or increases the subjects response by presenting a stimulus following the response. Specific praise is an effective low-inference reinforcer. It places emphasis on the behavior, rather than the child. This is an important component of enthusiasm in that it demonstrates appropriate interest. Beiler (1982) cautions that projecting enthusiasm is difficult and students might consider the teacher insincere if praise is inappropriately frequent of too methodical. Additionally, praise should be delivered as a genuine reaction to student accomplishment, not as an attempt to manipulate the student.

Appendix C

Instructions for Recording Enthusiastic Teacher Behavior

INSTRUCTIONS FOR USING THE TEACHER ENTHUSIASM MEASURE
(Invterval Recording)

NOTE: The teacher enthusiasm behaviors are to be evaluated by teacher trainers or those evaluators with background experience and knowledge of the unit of instruction being presented and instructional processes. The emphasis is on teachers' "enthusiasm" during classroom instruction.

1. There are six components of enthusiasm that can be evaluated using the TEM: (a) physical movement, (b) facial expression, (c) verbal delivery, (d) personalized information, (e) presenting tasks as positive challenges, (f) specific praise.

2. Become familiar with the six enthusiasm components as defined on the "Enthusiasm Definitions for Interval Recording" information form.

3. Use the Data Sheet (interval recording) to record the occurrence and non-occurrence of the six target behaviors described in the "Enthusiasm Definitions for Interval Recording" form. Each 10-minute observation session is divided into 10 second intervals. Their supervisor alternates monitoring of two sets of three behaviors per minute. For example: Observe the first three behaviors for 10 seconds (Set A) Then, observe the last three behaviors for 10 seconds (Set B) Continue alternating the monitoring of the behaviors for 10 minutes. A tape will be provided that signals when the interval begins and ends, as well as when to record observations for each interval. (A 5 second recording interval is alternated with the 10 second observation intervals).

4. Use a "+" to indicate the occurrence of the behavior and a "-" to indicate the non-occurrence of the behavior during the intervals.

5. Observe the student teacher for three 10-minute sessions during a large or small group instructional periods (3 students minimum). Follow the recording procedures outlined above. Each "+" indicates that the behavior identified on the data sheet has occurred.

6. Interrater reliability will be based on the level of agreement between your observation and the observation of asecond person observing the same behaviors at the same time. A second observer will observe at least one of the three 10 minute sessions.

7. Follow these observation procedural guidelines for each student you supervise.

ENTHUSIASM DEFINITIONS FOR INTERVAL RECORDING

1. **PHYSICAL MOVEMENT**
   - Moves arms out toward person or object.
     (this includes raises toward ceiling, and sweeping motions)
   - Points
   - Nods head up and down
     (self initiates as in an expression of encouragement, approval, etc.; not simply turning toward the speaker)
   - Walks from one point to another

NON-EXAMPLES (do not record)

Writing on chalkboard or at students' or teacher's desks is not recorded.

2. **FACIAL EXPRESSIONS**
   - Opens eyes wide then returns to normal position
     (i.e. gross expressions - eyebrows raised)
   - Changes positions of lips
     (e.g. smiles, frowns, simply talking)

3. **VOCAL DELIVERY**
   - Changes pitch in voice to higher or lower than normal pitch.
   - Increases volume or lowers it
     (as a tool for subject matter instruction only; not calling the name of a disruptive child or for disciplinary purposes)
   - Increases speed or slows down.

EXAMPLES

Inflections in the voice at the end of a question, or a question, or a reinforcing statement, etc. (e.g. "Where did the ball go?")

NONEXAMPLES

Verbalization requesting, demanding, or commanding attention is not recorded.

Reprimanding for non-attending or disruptive behaviors (e.g. "sit down," "be quiet," "you're not paying attention").

4. **PERSONALIZES INFORMATION**
   - Initiates, accepts, or encourages pupil responses and statements relating personal experience to the concept under discussion.

EXAMPLES

Calling a student's name, asking a student a question regarding an opinion or response, use of pronoun (you) is recorded.

EXAMPLES (Continued)

"How does this activity relate to dinner-time at your house?" (initiates)

A student thinks the autumn leaves are like quilting pieces. The teacher responds. . . "What an interesting comparison!" (accepts)

"What did we way about . . . earlier? Do you feel that way?" (encourages)

"Suppose you were on the ship, how would you decide?" (encourages)

"Alex, find your name on the board."

"Nina, what color is the circle I'm holding? Can you find something red in the classroom?"

5. **PRESENTS TASKS AS POSITIVE CHALLENGES**
   - Mentions content information or skills the student will learn during that lesson. It is mentioned as a positive statement of assignment or instruction.

EXAMPLES:

"We're going to sing a song about colors." (mentions content in a positive manner without apology)

"On Thursday we will role-play the Scopes Trial. Analyze the feelings, values, and attitudes of people in that small Tennessee town." (mentions content and information to be learned, this suggests learning is positive)

"Tomorrow we will select jurors for the trial. Before doing this, we need to find out the basis on which the prosecutor and defense attorney can reject witnesses . . . " (mentions information to be learned, this suggests learning is positive)

"There are three points we will identify in our discussion about . . They are . . . With this information you will be able to. ." (mentions skills to be learned, this suggests learning is positive)

"We're going to discuss the voyage of Columbus." (mentions content in a positive manner without apology)

"Read the author's critique of Twain's novel." (mentions content in a positive manner without apology)

NONEXAMPLES: (do not record)

"Several of you do not know your color names . . ." (apologetic, patronizing learning is negative approach)

NONEXAMPLES (Continued)

"I am sorry you must do this to learn . . ."
(apologetic, suggest learning is negative approach)

"Anyone caught daydreaming will learn an additional poem . . answer 5 additional questions . . ."
(extra assignments as punishment, this suggests learning is negative rather then positive)

"We're going to make history."
(does not mention content, dull)

"Read pages 17-22."
(does not mention content, dull)

"Finish your assignment and then you can do something that is fun . . . .something you want to do."
(suggests learning is negative rather than positive)

6. **SPECIFIC PRAISE**
   - A positive statement that specifies the particular accomplishment being praised.

EXAMPLE:
"Good", "Great", "I like that," when addressing student(s) in reference to a task being performed

"Your response indicates you have given . . . some thought."

"That is an interesting perspective."

"I like that analogy."

"You left the room quietly today."

NONEXAMPLES: (do not record)
Gestures (smiling, nodding, etc. is physical movement not to be recorded as a statement of praise)

"You're not following instructions."

"You're moving too fast."

Examples adapted from:

Beiler, R. F. & Snowman, J. (1982) Psychology Applied to Teaching (4th ed.) Boston: Houghton Mifflin.

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Appendix D
Enthusiasm Rating Scales

DATA SHEET

The supervisor records the occurrence or non-occurrence of the target behaviors during the intervals using "+" for occurrence and "-" for non-occurrence.

+ = Occurrence
- = Non-Occurrence

		1			2			3			4			5	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PM															
F															
V															
PI															
PT															
S															

		6			7			8			9			10	
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
PM															
F															
V															
PI															
PT															
S															

Behaviors:
PM = Physical Movement (Arms out, points, nods head, walks)
F = Facial Expression (Eyes open wide, lips change)
V = Vocal Delivery (Change pitch, volume, speed)
PI = Personalizing Information (Initiates, accepts, encourages, relates)
PT = Presents Tasks as Positive Challenges (Mentions content without apology)
S = Specific Praise (Statement regarding accomplishment)

Appendix D

Enthusiasm Rating Scales

TOTAL SCORE ____________

STUDENT ____________

SCORE	* ENTHUSIASM RATING SCALE	Low	Medium	High
		1 2	3 4 5	6 7
____	1. Physical Movement	Seldom moved arms out toward person or object; kept arms at side or folded, rigid. Seldom moved from one spot, or from sitting to standing position. Seldom opened eyes wide or moved head around up or down	Often pointed and moved arms out toward person or object. Occasional sweeping motion using body, arms, or hands. Occasionally moved from one spot to another, or from sitting to standing position. Occasionally opened eyes wide, or moved head around up, or down.	Maintain steady pace of gesturing (moving arms out toward person or object; pointing, sweeping motion using body, hands, or arms). Frequently moved from one spot to another or from sitting to standing position. Often opened eyes wide or moved head around, up, or down.
____	2. Facial Expression	Little variation in facial expression. Seldom opens eyes wide or changes position of lips (smiling, frowning, open wide)	Some variation in facial expression. Occasionally opens eyes wide or changes position of the lips (smiling, frowning, open wide)	Frequent variation in facial expression. Often opens eyes wide or changes position of the lips (smiling, frowning, open wide)
____	3. Vocal Delivery	Little variation in pitch (high, low); volume (loud, soft); or speed of speech (fast, slow)	Some variation in pitch (high, low); volume (loud, soft); or speed of speech (fast, slow)	Frequent variation in pitch (high, low); volume (loud, soft); or spped of speech (fast, slow)
____	4. Personalizing Information	Little indication of initiation, acceptance, or encouragement of student statements or responses regarding personal experiences in relation to subject content	Some encouragement and initiation of student or teacher experience (classroom projects, other specific experience, etc.) as it relates to the concept to be learned	Quick to initiate, accept, or encourage responses and statements relating personal experience to the concept to be learned
____	5. Presenting Tasks as Positive Challenges	Seldom mentions information or skills the student will learn (advance organizers). Presents the learning activity itself as a penalty or punishment	Often mentions information or skills the student will learn (advanced organizers) and predicts the learning activity will be a pleasant, enjoyable experience.	Quick to mention information or skills the student will learn (advance organizers) and predicts the learning activity will be a pleasant enjoyable experience
____	6. Specific Praise	Seldom specifies the particular accomplishment being praised	Some specification of the particular accomplishment being praised	Always specifies the particular accomplishment being praised

*(Adapted from Mary L. Collins, 1976)

TEACHING POETRY CAN BE A JOY

Frances Mouzon

One of the processes of deeds of mankind is the creation of poetry. And one of the important and universal businesses and pastimes of the American people is the singing or reading of poetry on some level.

Their dependence upon the printed page for information, pleasure, and curiosity has fastened the teaching of literature in the English curriculum. The practice of teaching verse to many young Americans has not lessened even though they are confronted with the difficulties that verse presents.

Statement of the Problem

The purpose of this study is (1) to discover the "why" of the negative attitude exhibited by pupils when they study poetry; (2) to understand more clearly the elements involved in the study of poetry (teacher, pupils, locale, and literature); and (3) to analyze the rudiments of methods to see if these are germane to the students' attitudes which range rom indifference to hatred for the study of poetry in the classroom.

Reasons for the Study

In American education almost everyone believes in teaching literature to high school pupils. Almost no one is convinced that we have succeeded in doing this with anything like satisfactory outcomes in enjoyment and appreciation of good literature.[1] From the amazing number of popular paperbacks, and "pulp" magazines published and made available to the American populace, English teachers have come to realize that there is little relation between the literature they teach and the material which many students will read after graduation. From this point of view, how can one justify the emphasis upon literary masterpieces and new methods of teaching them?

With the compilation of new text books, anthologies, and handbooks, more and more of the traditional "background" classics are bowing out to make room for contemporary selections; and yet the teaching of poetry remains a problematic affair to be encountered by teacher and pupil. To what can this negative attitude towards good literature (poetry) be attributed?

In this study an effort will be made (1) to compare some of the earlier methods utilized in the teaching of poetry with those of more recent practice; (2) to show the relationship of changed objectives to this teaching-learning situation; (3) to show how

teacher-attitude influences pupil attitude, and (4) to show how literature from the past is significant to the boys and girls of our day.

Method of Procedure

A survey of fifteen books and several recent periodicals reflects some of the many changes which have taken place in literature teaching methods as result of knowledge, social philosophy, and tested experiences in teaching and learning in secondary schools.

Some of the aspects of education emerging and more clearly defined at the turn of the century were; (1) the objectives of education defined as social adjustment and self adjustment in relation to the curriculum, (2) and the problems of method considered by teachers and pupils to develop growth towards these objectives. But, only a brief summation of certain phases of methodology as related to teaching of poetry in high school will be treated here.

Accordingly the first topic lays down some "Principal Objectives on the Functions and Uses of Poetry," and the second discusses the "Rudiments of Method." This exposition will endeavor to contrast some earlier objectives and methods of teaching poetry with the more recent ones. Part three shows by illustration how a unit of work may be planned and executed as an enjoyable classroom experience.

The concluding part offers a condensation of findings; a discussion on the implications of the findings, and presents some recommendations that may prove helpful as a solution to the problem.

Definitions of Terms Used

The meaningful definition of poetry selected for use in this study is found in the thoughtful essay, The Study of Poetry by Matthew Arnold which says "Poetry" is:

> One of the means man possesses for recounting his experiences, expressing his ideas and feelings, and solving his problems; it is one of the means, in short, that man employs for interpreting his life and thereby the lives of all of us.

The mechanical process of poetic composition, termed as versification shall be referred to in this report according to the accepted standards of characterization and interpretation in the field of English literature.

Creative reading is a new term for an old art of which the school room knows little. It means to transmit the message directly as a good actor, making one forget the word, the delivery, and the person speaking.

A **unit** is to be understood as an experience strand. For example the strands of experience in poetry would range from short narrative poems to the lyric.

Some Principal Objectives on the Functions and Uses of Poetry

Vehicles very widely from the cumbersome, noisy wagon to the noiseless, shockless automobiles, and trains. Then should one fancy; there are the aeroplanes which invite him to leave the land and venture the pleasures of atmospheric heights. These inventions of man are useless unless they carry people or commodities. The materials transferred may be freshly mined ores or highly refined products.

Language has long been spoken of as a vehicle for thought. As consideration is given to vehicles and materials to be transferred in the industrial world, so in literature consideration must be given to the form in which thought is conveyed.[3] Seeley opines that only in poetry do form and thought conspire to make a powerful impression. Through this medium life is portrayed more poignant and vibrant than in other literary forms. He further avers that wherever man has been, poetry has been also; for man has sung of his environment, of his thoughts, of his experiences--whether primitive or civilized. These songs have enraptured mankind, and he has listened and has sung again himself--to record the events and emotions of his life; to escape from realities into another world, or to interest himself or to amuse his companions.[4]

Traditional Era

The integral function of poetry from barbarian times to our day is a racial heritage to be enjoyed by boys and girls but on the contrary one meets an inherent apathy or hate toward poetry. The question is raised: "What has alienated our boys and girls from literature we wish them to love?"

Mirrielees made this observation pertaining to the problem that children have with appreciating the charm and force of poetry. Children have a native delight in verse. At four they respond to rhyme, rhythm, whimsy, jingles and fanciful ideas. By sixteen they are "off" poetry. At twenty some have reached a pathetic state of enjoying an occasional bit of newspaper verse. She further states:

> Would be moralists of the traditional era have used poetry more than prose as a means of instruction. Then too, some lengthy works ("Evangeline" or "Thanatopsis") have been studied to the point of weariness.[5]

Another barrier erected against the enjoyment of of poetry by the traditional era was the use of poetry for mental discipline and castigation. Might it be that these functions and objectives deafened their ears to the joyful experience of hearing the subtle refrains of poetry?

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Contemporary Era

Educators and curriculum builders of this period are concerned with new objectives namely, (1) to teach democratic ideals, (2) to develop humanistic points of view, (3) to enhance cultural status, (4) to develop understanding of poetry, fundamental to appreciation and enjoyment of poetry, and (5) to become familiar with poetry. However there remains a "fixity" of the older era. Teachers of the former period have carried over their negative attitudes and approaches toward teaching of poetry.

Education has not moved forward with life. Instead it has clung to forms which are out of harmony with contemporary civilization. "Thus far," purports Fiari, "the new objectives for the uses of poetry are majorly a possibility and not a force."[6]

Rudiments of Method

The English teacher is a part of one of the most dynamic, changing, challenging forces in American life, and she is interested primarily in the selection of learning experiences that will produce the desired adaptation language in oral and written communications, as well as respect and appreciation for good literature.

By focusing on practical methods of teaching that have been utilized in the classroom in the teaching of poetry one can see what arts and sciences have combined to improve teaching skills . The learning-situation implies that there must be a teacher, learner, and a locale (usually the classroom), and the material. The teacher's role is to give direction or guidance to the learning situation.

Teacher-Centered

In his experiment to determine the contributing force of each factor (teacher, poetry, pupil, and locale) toward the unpleasantness involved the teaching of poetry to high school students, Seeley relates that a poetry composed of English teachers decided to each select a poem to read and comment upon at their next meeting. When the group met each one pointed out to the rest of the members, the beauty of meaning, reread certain lines, asked questions, contrasted and compared their interpretations and ideas. The evening was a delightful one for all. The leader suggested at the close of the meeting that each one come to the next appointment prepared to demonstrate how he would handle the same poem in the classroom.

The same faces and poems were present at the next meeting--but not the same people. Seeley's friends had become Teachers and they had prepared for the classroom.

Some refused to discuss their poems for such reasons as: it would not do for boys and girls, too tragic, too free in forma nd the love theme is too sophisticated. Finally when it was

determined what was usable, all seemed to settle on this question: "What shall I get my pupils to do with this poem?" In process "a plenty" was planned. The suggested list of activities for the students was (1) historical data, (2) sociological and critical introductions, (3) biographical reductions, (4) word lists, (5) paraphrasing, (6) memorization, and (7) "lessons brought home." Then the teachers began to bicker among themselves as to what assigned task would be the most beneficial to the student.

This unhappy experiment reveals that the elements were the same in both situations except one--the locale. Here is a graphic illustration of how teachers experience poetry as enjoyable out of the classroom but immediately change when dealing with it in the school room. And please note that the change of attitude comes with the function of poetry. To the teacher poetry becomes a prop to hang tasks on and not something to enjoy.[7] As the study progresses one shall be able to notice that a change of objectives may be an aid toward a change in attitude.

Teacher-Pupil Centered

Where schools are progressing toward democratization of classroom procedures the teacher-pupil balance in formulating academic experiences of planning and acting are carried out by combining related group needs and interests. This technique is a newer point of view of the responsibility of the school toward helping the individual attain positive attitudes through personal and social adjustment. Here as elsewhere there is absence of dominant teacher leadership.[8]

Further lucidating contemporary methods, Mearns says that the new approach is spontaneous natural: quite unlike school, but enjoyable. Each group is given the experience of hearing literature read in the way one believes it should be done. The young are auditors and they must find for themselves a sincere feeling for the mood of the poem, There is no distraction brought about by the printed page, and the student is left free to react with the whole body. When a true perception of the joy of poetry is formed classrooms take on the form of literary societies as "Robert Frost Club," the "Burns Group," or the "Romanticists" and other titles. In this pleasant way the students are introduced to a new world of ideas. Almost imperceptibly they are lead to discover the thrill of joy in best literature of the past and present. Their first conscious response is an awareness of the poets' feelings and ideas which leads to a discovery of their own unconscious utterances. For they too, have similar experiences which because of experiencing poetry are more clearly understandable. Poetry then becomes a meaningful device to help solve physical, social and economic problems: the interpretation of life.

Both students and teachers realize that poetry is an outward expression of instinctive insight, which must be summoned from the great deep of their mysterious selves. Therefore, it cannot

be taught; it cannot be summoned; it may only be permitted. No conscious effort will be made to force one's taste in matter through school-teaching appeal or authority. However, if a good library is available, much poetry will be read, discussed, and memorized by each individual's choice. Thusly opines Mearns.[9]

Mirrielees infers that the teaching of poetry is more than any other literature, fraught both with possible danger and with delight. Between the devil of overconscientiousness and the deep sea of ignorance one will have to pick his way carefully--and beware of teaching too little or too much.[10]

CONCLUSION

The remarkable expansion of knowledge has brought many changes in society. Preparation to meet new occasions has resulted in many changes in the English curriculum. Exhibitions of these changes are established through content, goals, and methods. The increased problems in social relations have added impetus to research and evaluation of institutions, including the schools, to see what powers, skills, and increase of knowledge can fortify one with moral values to cope with material progress.

Findings

The introduction of this research compilation stated that the giving attention to poetry on some level is one of the most important businesses and pastimes of the American people.

Our English program in the high school teaches communicative skills and poetry to many young Americans who show intense dislike for these phases of the curriculum. When the classroom experiences are completed many are alienated not only from verse but also from reading and writing which are done on a mediocre basis when they must be utilized for pleasure or service.

The objectives for the function and use of poetry in the traditional era were prescribed by the teacher alone and from the busy work engaged in, it seemed that work itself was the rewarding virtue. Only the aura of the teacher's emotional bliss dispelled the foreboding dictatorial methods of procedure, and atmosphere of the classroom.

Today the educational philosophy has caused the teachers to consider first the boys and girls' needs, interests, maturation and to permit them to help in implementing the experiences to be engaged in as well as the choice of literature. With prevision a flexible program of meaningful and useful experiences are engaged in and enjoyed.

Implications

The primal instance of poetic expression is inherent and useful form antiquity to our day. Poetry belongs to the human race. There are needed skills to apply in order to thrill to rhythmic verse. Is one's indifference to this art exhibited by hatred,

the foster child, "ATTITUDE," a product from traditional forces? Or can it be that this age of mechanism has blunted the sensibilities of youth, weakened their physical, mental and emotional members from responding to life's experiences in this overt way? Exactly, what forces have united to erect a barrier between mankind and his primal instinct and heritage?

Recommendations

The findings and implications given in this report are elemental for the following recommendations:

1. That the teacher have an educational philosophy and a philosophy of life developed so that the function and uses of poetry are clear to her.

2. That she will use this dynamic experience and be willing to experiment with new ways of teaching literary skills.

3. That she change her mind-set (attitude), if necessary, toward breaking down the barriers that have been erected against the enjoyment of poetry in the classroom; and use methods that will make this phase of work a joy.

ENDNOTES

1. Hughes, Mearns, Creative Youth (New York): Doran and Company, Indl, 1925), p. viii.

2. Howard F. Seeley, Enjoying Poetry In School (Atlanta: Johnson Publishing Company, 1931), p. 7

3. Hughes, Mearns, Creative Youth (New York: Doran and Company, Inc., 1925, p. i-iii.

4. Howard F. Seeley, Enjoying Poetry in School (Atlanta: Johnson Publishing Company, 1931), p. 7

5. Lucia B. Mirrielees, Teaching Composition and Literature in Junior and Senior High Schools (New York: Harcourt Brace and Company, 1952), p. 380.

6. Harvey Flari, "Out of Chaos--Learning," English Journal, XLVIII (May, 1959), 262-264; Harry Rivlin, Teaching Adolescents in Secondary Schools (New York: Appleton Century-Crofts, Incl, 1948) pp. 114-138.

7. Seeley, op. cit., pp. 8,50.

8. Hughes Mearns, Creative Youth (New York: Doubleday-Doran and Company, Inc., 1925, pp. 37-52. Dwight L. Burton, Literature Study in High School (New York: Henry Holt Company, 1959), pp. 176-194. Herbert Klausmeier, Principles and Practices of Secondary School Teaching, (New York: Harper and Brothers, 1953), pp. 103-108.

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9. Ibid., pp. 135-167.
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Janet Harrison, "Notes on Teaching Poetry,"
Ibid., p. 253.

10. Lucia B. Mirrielees, Teaching Composition and Literature in Junior and Senior High Schools (New York: Harcourt Brace and Company, 1952), p. 407

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LACTATE DEHYDROGENASE ACTIVITY IN BENZOYL PEROXIDE INDUCED PLATELET AGGREGATION[1]

Ephraim Tobela Gwebu, Jenee Bowman, Ava Rivers, Joy Walker
Valencia Andrews, Juliet Bailey, and
Sharon Robles

INTRODUCTION

Benzoyl peroxide (BPO) is used in industry and medicine. Industrially, BPO is used for the manufacturing of plastics. As a bleaching reagent, it is incorporated into substances such as flour, as a commercial preparation at a concentration of approximately 15 parts per million. In dentistry, BPO is used as a component of resin cements. It is an effective and widely used agent in the topical treatment of inflammatory acne (Anderson et. al. 1975), decubitus (bed sores) and other cutaneous ulcers (Pace 1976), and pyoderma gangrenosum (Nguyen 1977).

Our previous studies have shown that benzoyl peroxide induces human platelet aggregation in a dose-dependent manner. At a benzoyl peroxide concentration of 0.6mM the aggregation was biphasic, a phenomenon also observed when aggregation was induced by epinephrine and ADP. Indomethacin was not an effective inhibitor of this aggregation. However, vitamin E was a potent inhibitor of benzoyl peroxide-induced aggregation (Gwebu et al. 1983).

The purpose of the present study was to determine whether benzoyl peroxide induces platelet aggregation by indiscriminate platelet lysis or by the normal process of platelet activation. If platelet lysis occurs during benzoyl peroxide-induced aggregation, then the LDH activity should be elevated in the plasma following aggregation. It is well known the ADP-induced platelet aggregation does not involve platelet lysis as determined by lack of LDH elevation (Evans 1985). Peake et al. (1984) have reported that when platelet lysis is prevented, platelet-poor plasma and serum show essentially the same LDH activity.

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[1] Manuscript received 25 May 1987; accepted 7 December 1987.

MATERIALS AND METHODS

Preparation of Platelet Rich Plasma (PRP)

Blood was collected from healthy human volunteers who had not ingested aspirin or aspirin-like substances for at least two weeks. Nine volumes of blood were combined with one volume of 3.8% sodium citrate solution in a plastic centrifuge tube. The mixture was centrifuged for 10 minutes at 1150 rpm. After removal of the PRP, the remaining contents were centrifuged for 15 minutes at 2000 rpm to obtain platelet poor plasma (PPP). The PPP was used as reference for 100% light transmission on the aggregometer.

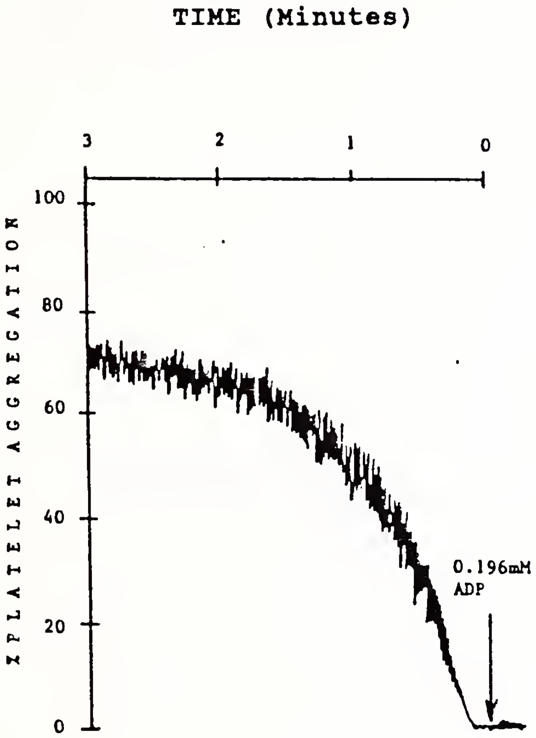

Figure 1. ADP - Induced human platelet aggregation measured as percent. Ten microliters of ADP was added to 500 microliters of platelet-rich plasma and aggregation was monitored for three minutes.

Lactate Dehydrogenase Activity

Platelet Aggregation

Crystalline benzoyl peroxide (BPO, Aldrich Chemical Company, Milwaukee, WI) was dissolved in methanol and used to induce aggregation. Platelet aggregation was induced by 0.98 mM BPO and measured for 3 minutes on an aggregometer (Chrono-Log Corporation, Havertown, PA) as previously described (Gwebu et al. 1983). The contents of the cuvettes were transferred to a plastic centrifuge tube. the process was repeated with 0.196 mM Adenosine 5'-diphosphate (ADP) as the aggregating agent. In addition, a sample of PRP was freeze-thawed five times to lyse the platelets. The three tubes containing BPO-treated, ADP-treated, and freeze-thawed aliquots, respectively, were then centrifuged at 3000 rpm for 15 minutes to obtain platelet free plasma (PFP). the supernatants (PFP) were used to assay for lactate dehydrogenase (LDH) activity.

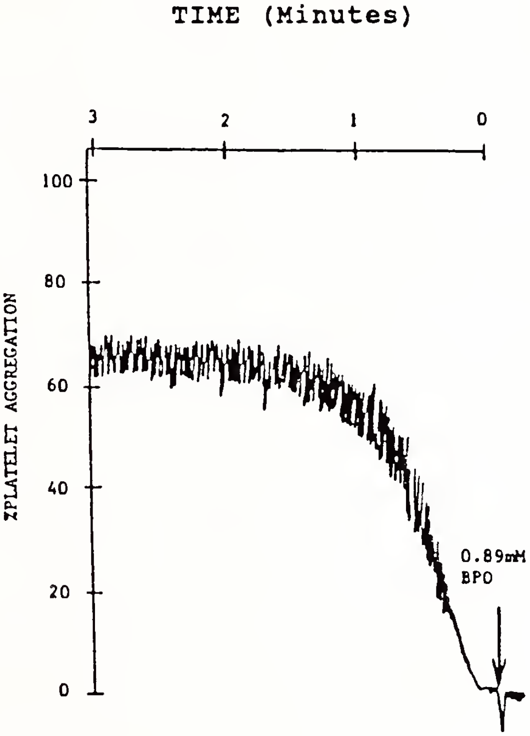

Figure 2. Benzoyl Peroxide - Induced human platelet aggregation measured as percent. Ten microliters of benzoyl peroxide was added to 500 microliters of platelet-rich plasma and aggregation was monitored for 3 minutes.

Lactate Dehydrogenase Assay

The lactate dehydrogenase was assayed according to the Sigma Colorimetric LDH Procedure [kit#500] (Sigma Diagnostics, St. Louis, MO). This procedure recommends the use of serum, however, in our study platelet-free plasma was used in place of serum. Platelet-free plasma was preferred over platelet-poor plasma to totally exclude platelets in the samples. Platelets in plasma have been shown to interfere with the LDH assay (Peake et al. 1984).

RESULTS AND DISCUSSION

Platelet aggregation induced by ADP and benzoyl peroxide is illustrated in Figures 1 and 2, respectively. The LDH standard curve is shown in figure 3. The LDH activity in the platelet free plasma of ADP-treated, benzoyl peroxide treated and freeze-thawed platelet rich are shown in Table 1. The freeze thawed (lysed) platelets are expected to have maximum LDH activity.

The lactate dehydrogenase activity in the freeze-thawed platelet-free plasma was nineteen times the activity in the benzoyl peroxide-treated platelet-free plasma. The enzyme activity in ADP-treated platelet-free plasma was our control. It is evident from these data that benzoyl peroxide-induced platelet aggregation does not involve platelet lysis.

Studies are underway to elucidate the mode of action of benzoyl peroxide on platelet function.

Table 1. Lactate Dehydrogenase Activity based on spectrophotometric analysis.

Platelet-Free Plasma	Spectrophotometric Absorbance at 495 nm	Total LDH Enzyme Activity (B-Bunits)
Freeze-thawed PRP (7 samples)	0.06 ± 0.10 (SD)	1.9×10^3
ADP-treated PRP (6 samples)	0.78 ± 0.10 (SD)	1.4×10^2
BPO-treated PRP (6 samplea	0.81 ± 0.12 (SD)	1.0×10^2

* B-B is Berger-Broida units (Sigma)
1 B-B unit x 0.48 = 1 International Unit

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Lactate Dehydrogenase Activity

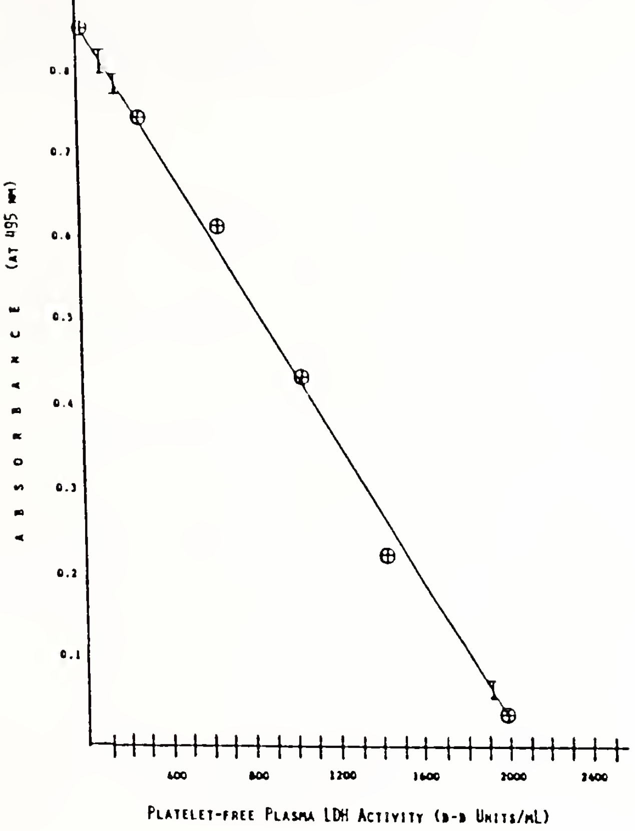

Figure 3. Calibration curve for platelet-free plasma LDH. One international unit (U) of an enzyme is defined as that amount of enzyme that will convert lumol of substrate per minute under the specified conditions of the procedure. The conventional units of LDH as used in the described procedure may be converted to U by multiplying by 0.48.

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ACKNOWLEDGMENTS

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EFFECT OF DDT ON HUMAN BLOOD PLATELET AGGREGATION[1,2]

Ephraim Tobela Gwebu, Carla Braxton, Ava Rivers,
Joy Walker and David Crump

INTRODUCTION

A problem of immediate concern is the effect of DDT (dichlorodiphenyl trichloroethane) on the health of Triana residents in North Alabama. These residents have been drinking water and eating fish from local rivers contaminated with DDT for over 35 years. In 1980, the Centers for Disease Control in Atlanta reported an average serum DDT level 4 times higher than normal in 12 Triana residents. This report prompted us to examine the effect of DDT on platelet aggregation in vitro.

Platelet aggregation is the adherence of one platelet to another. Aggregation of human blood platelets is the first hemostatic response to vascular injury, It can be induced by adding aggregating agents to platelet rich plasma, in vitro. Platelet aggregation is a very sensitive physiological phenomenon, influenced by various drugs and many other substances (Kangasaho et al., 1983). Human blood platelets thus provide a useful experimental tool to investigate the potential harmful effects of xenobiotic materials such as DDT.

MATERIALS AND METHODS

Preparation of DDT-Treated Blood and Platelet-Rich Plasma

Blood was collected from non-Triana, healthy human volunteers who had not taken drugs known to interfere with platelet function for at least three weeks. Nine volumes of blood were mixed with one volume of 3.8% sodium citrate anticoagulant. The blood was divided into two parts. To one part was added DDT (dissolved in methanol) to give a concentration of 0.17mM. The other part was mixed with methanol and used as control blood. The samples were left standing at ambient temperature for 2.5 hours with mixing at regular intervals (Figure 1). After 2.5 hours, platelet-rich plasma (PRP) was prepared according to the procedure of Panganamala et al. (1977).

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[1] Manuscript received 25 May 1987; accepted 8 December 1987.

[2] Presented in parts at the 65th Annual Meeting of the Federation of the American Societies for Experimental Biology, April 1981.

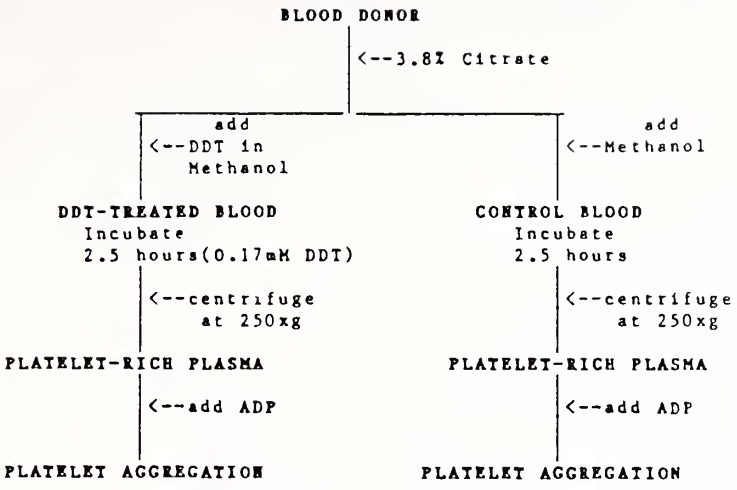

Figure 1. Flowchart for preparation of test and control samples.

Platelet Aggregation

Adenosine diphosphate (ADP) (0.2mM) was used to induce platelet aggregation. Ten microliter aliquots of ADP were added to 0.5ml of PRP from either DDT-treated blood or methanol-treated blood (control). Platelet aggregation was measured with an aggregometer (Chrono-Log Corp., Havertown, PA) while the PRP was maintained at 37° and stirred at 1200 rpm throughout the aggregation experiment. Platelet aggregation was monitored for 3 minutes.

RESULTS AND DISCUSSION

The effect of pre-incubating blood with DDT on platelet aggregation was studied. Platelet aggregation in PRP prepared from DDT-treated blood was induced by adding ADP (0.2mM) and measured with an aggregometer for 3 minutes. This aggregation was 25 ± 4% (6 volunteers) compared with platelet aggregation in control blood of 68 ± 2% (6 volunteers), showing that DDT impairs human platelet aggregation. Figure 2 shows the typical contrasts in platelet aggregation between control blood platelets and DDT-treated blood platelets. We conclude that when human blood is exposed to 0.17mM DDT for 2.5 hours, ADP-induced platelet aggregation is inhibited. However, when PRP from blood not treated with DDT was pre-incubated with DDT for 10 minutes prior to adding ADP, platelet aggregation was not inhibited. Krug et al. (1985) have also reported that when PRP is exposed to DDT for 10 minutes, there was no inhibition of platelet aggregation. Platelets lose potency if left in PRP for an extended period, therefore we did not incubate PRP with DDT for 2.5 hours. When PRP was pre-incubated with DDE (Dichlorodiphenylethylene) for 10

minutes, platelet aggregation was strongly inhibited (Krug et al., 1985). It is possible that blood platelets convert DDT to DDE during a 2.5 hour incubation period at ambient temperature. Therefore, the observed inhibition of platelet aggregation in DDT-treated blood may be due to DDE.

DDT and Human Blood Platelet Aggregation

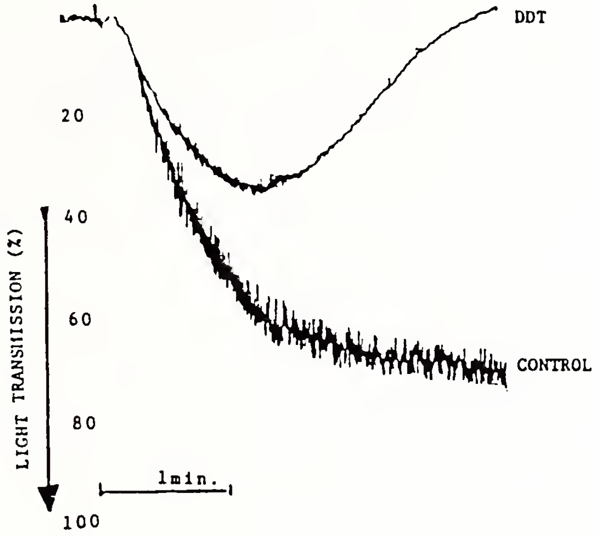

Figure 2. Aggregation pattern for platelets from DDT-treated blood compared with control. The blood was pre-incubated with 0.17mM DDT for 2 1/2 hours prior to preparation of platelet-rich plasma. Aggregation was started with 0.2mM ADP.

Studies are underway to determine (a) whether platelets in PRP or in whole blood metabolize DDT to DDE, and (b) the mechanism of DDT inhibition of platelet aggregation.

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A TEACHING MODEL FOR ASSIGNING QUANTUM NUMBERS TO ELECTRONS

E. A. Cooper

One of the most exciting topics for students in the general chemistry course is the topic of atomic structure, including specifically the writing of electron configurations and the assignment of quantum numbers to the extranuclear electrons in the atom. Through the years the author has observed that the ethos of the class usually jumps to a higher level of interest when these topics are clearly and interestingly presented.

Most general chemistry textbooks do a reasonably good job in presenting such subtopics of atomic structure as (a) the concept of the nuclear atom, (b) the relationship between atomic structure, atomic spectra, ionization energy, and chemical periodicity, and (c) the writing of electron configurations and the drawing of atomic orbital diagrams. However, most textbooks offer the student little help in understanding how to assign quantum numbers to electrons.

The following is a simple and effective teaching model which the author has developed and which his students have found to be extremely useful in helping them to learn how to properly assign quantum numbers to electrons in atoms.

This model adheres to the convention that electrons are allowed to assume minus values (lower energy states) for "m" and "s" before plus values.[1]

MAGNETIC (m) AND SPIN (s) QUANTUM NUMBERS ACCORDING TO SUBLEVEL

"m" AND "s" VALUES FOR THE "s" SUBLEVEL ($\ell=0$)

0
-½ 1st
+½ 2nd

"m" AND "s" VALUES FOR THE "p" SUBLEVEL ($\ell=1$)

-1	0	+1
-½ 1st	-½ 2nd	-½ 3rd
+½ 4th	+½ 5th	+½ 6th

"m" AND "s" VALUES FOR THE "d" SUBLEVEL ($\ell=2$)

-2	-1	0	+1	+2
-½ 1st	-½ 2nd	-½ 3rd	-½ 4th	-½ 5th
+½ 6th	+½ 7th	+½ 8th	+½ 9th	+½ 10th

"m" AND "s" VALUES FOR THE "f" SUBLEVEL ($\ell=3$)

-3	-2	-1	0	+1	+2	+3
-½ 1st	-½ 2nd	-½ 3rd	-½ 4th	-½ 5th	-½ 6th	-½ 7th
+½ 8th	+½ 9th	+½ 10th	+½ 11th	+½ 12th	+½ 13th	+½ 14th

In this model the values for the "n" and "ℓ" quantum numbers are obtained from the last notation in the electron configuration of the element. Values for the "m" and "s" quantum numbers are obtained by observing the "m" values and "s" values associated with the particular electron in the specified sublevel.

PROBLEM: Determine the values for the four quantum numbers for the 26th electron in the iron ($_{26}$Fe) atom.

SOLUTION: Step No. 1 Write the electron configuration for Fe.
$_{26}\mathrm{Fe}\ 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$

Step No. 2 The last notation ($3d^6$) indicates that the principal quantum number (n) is 3 and that the azimuthal quantum number (ℓ) is 2.

Step No. 3 The model shows that the 6th electron in the "d" sublevel has a value of -2 for the magnetic quantum number (m) and a value of +1/2 for the spin quantum number (s).

In summary:

n	ℓ	m	s
3	2	-2	+1/2

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STUDY OF THE PICARDY THIRD AS IT WAS USED FROM THE LATE SIXTEENTH CENTURY THROUGH THE MID-NINETEENTH CENTURY

Shirley Beary

FROM MODALITY TO TONALITY

One of the first essentials for a system of musical composition is the formulation of a series of notes which stand in a recognizable relationship to one another--commonly known as a scale. Without some organization, there is nothing the mind can grasp and retain in a succession of sounds whose relations are not appreciably definite. One should not surmise however that scales are first systematically formed and then a system of writing music comes about naturally. In actuality, scales are created in the process of endeavoring to make music, then they continue to be modified and altered for generations even after the art has achieved a high degree of sophistication. The major and minor scales which have so able served Western music since the development of tonality, arrived at their present condition after a gradual process of modification requiring nearly a thousand years.[1]

For nearly a thousand years the music of the Christian Church was the principal music of Western civilization and the style meeting the approval of the clergy was the monophonic, modal chant. As long as the church reigned supreme, tonality and harmony remained in the background. However, with the gradual weakening of the Church's authority, a literature of secular song appeared (9th-14th centuries). Undoubtedly secular song played a significant role in medieval society also, but comparatively little of it has been preserved. In many respects the secular songs were similar to plainchant, but with some unique features of their own. For example, secular songs were often metrical and typically in triple meter, they had stronger and more regular rhythms, and while they were generally modal, the major (Ionian) and minor (Aeolian) modes were favored.[2]

The system of music in Western civilization is the only one in which harmony plays so decisively a role in the scheme of artistic design. Other systems are basically melodic, but the Western scale was devised and entirely transformed from the modes in order to accommodate the harmonic scheme of musical art.[3] While the Church was in control, harmony appeared mainly as a result of combining separate melodies which the various voices sang together. Attempts to compose secular music were made in the same contrapuntal procedure as was used in the Church songs. Folk-melodies were influenced by the modes taught by the church and even the more highly organized songs of the Troubadours, to

their creator's consternation, had to submit to the influence of the ecclesiastics for they were the only ones who had devised a system for accurately recording music.

The unpolished efforts of the early contrapuntalists, both sacred and secular, served as the basis of one of the greatest eras in musical art. They were the source of the system of harmony which distinguishes Western music from all others. The period from the ninth century to the close of the fifteenth was, in a sense, the infancy of tonality when the ideas and modes of musical thought were still indefinite and unsystematised, however, sometime about the end of the fourteenth century came a turning point and the experimental activity took on a certainty of aim and execution. The Ars Nova (14th century), representing the close of the Middle Ages and the foreshadowing of the Renaissance, promoted a highly significant harmonic development. Previously only unisons, octaves, fourths, and fifths had been considered consonant intervals; now thirds and sixths appeared more frequently in accented positions.[4]

It is interesting to note that at approximately the same time the term "counterpoint" appeared (c. 1300), the Englishman, Walter Odington, asserted the third as a consonance and accounted for it as the middle note of the fifth, thus establishing the basis of the triad with its root, third, and fifth.[5] Music theorists, from the first half of the fourteenth century, began to give rules for the vertical distribution of three tones.

The earliest extant example comes from Johannes do Muris who is known to have been in Paris in 1321, but the date of his Ars discantus, containing the rules, is uncertain.[6] It must be remembered here, as in most places when dealing with theoretical treatises, that the ideas expressed in them are behind the activities of the practical musicians who have been incorporating them in their music for some time. In reality, a treatise may describe a mode of thinking which had been in use thirty or forty years, therefore, the rules advocated by Muris could actually have been used during the late thirteenth century.[7]

The fifteenth century, which witnessed the final transition from Middle Ages to Renaissance, brought a preponderance of three-part polyphony. Numerous thirds were used in melodic progressions while the English discant and the continental fauxbourdon exploited first inversion chords.[8]

Although modality was still felt in the sacred and secular music of the sixteenth century, by mid-century, a strong trend toward major-minor tonality was apparent. About the same time musicians began to think of harmonies as a primary building material of music.[9]

It would be erroneous to conceive that harmony and all that it implies was achieved simply. In such forms as the old motets where various tunes were forced to go together, it was a matter of pure chance as to which harmonies or cacaphonies succeeded each other However, as the composers gained experience, they

perceived the effect of contrast and variety which could be obtained by distributing chords with regard to their relative degree of harshness. Obviously it became a fascinating study to determine how to control the motion of the voices to obtain a constant variety of accent, alternation of crises, and harmonic effect required for a satisfying effect. Composers adopted a method of procedure in which the effect was not obtained by the melodic contours of the parts, but rather by the succession of simple harmonies in which the vices moved in blocks of chords similiar to modern harmonization. There did remain, however, a marked difference--in modern harmony, the chords move in subordination to the principles of tonality. In the sixteenth century, the progressions moved according to the regulations of the modes with much less system in their distribution.[10]

Medieval musicians detested the interval of the augmented fourth which appears between F and B; they called it the Diabolus in musica. Singers were allowed to flat the B whenever the objectionable interval occurred in a melodic passage.

Sharps and flats were introduced, not to give the effect of change of key, but to avoid the offensive interval or to make a cadence more pleasing to the ear. When B-flat was introduced, it was to avoid the tritone.[11] When composers discovered that the introduction of the flat to B produced, between B-flat and E, the very interval they were trying to avoid, they evaded the obnoxious interval once again by adding a flat to E. Their object was to soften a melodic passage. Sharps were introduced on grounds less concerned with melody. The cadence which made use of the succession of the chords of D-minor to G caused the musicians to sharp the F. The sense of need for a penultimate major chard was in reality a harmonic consideration, but also melodic in that it provided a semitone leading to the final.

Once these supplementary notes had been added for one purpose, composers soon used them for other purposes. The use of these accidentals provided opportunity to learn the important relationships between tonic and dominant and also provided a new concept of the nature of the musical scale.[12]

Frequent use of musica ficta notes ultimately assimilated the modes to such a degree that often little more than technical traditions, differences of style, and forms of cadences distinguished music written in one mode from that written in another. this assimilation of the modes into a system of keys was a necessary prerequisite to the development of true harmonic music.

The early Baroque (1600-1750) concept of tone was halfway between the Medieval-Renaissance hexachord and mode and the Classical-Romantic key. By the end of the Baroque the eight original tones had become keys. Key meant a tonal center with its dominant and sub-dominant but with the character of the mediant as a matter of color: G and g were separate tones, however, by 1750, they were regarded as different colors--major and minor--of the single key of G.[13] A new harmonic concept in

music appeared during the Baroque with the figured bass. Chords and their inversions were finally recognized in Rameau's *Traite de l'armonic* (1722). Authentic cadences replaced the older modal cadences, chromaticism was widely used, and systematic modulation became common. The modern concept of major and minor tonalities had finally replaced modality.

Tonality made possible an over-all conception of a piece of music from a harmonic viewpoint. Only when tonality was firmly established, was it possible to determine the relative importance of chords built on the different degrees of the scale as they related to a tone center or tonic.[14]

In order to avoid a deadly monotony in tonality, composers found they had to be able to pass from key to key to maintain interest. In the sixteenth century, before composers were tied to the major-minor system, there was greater freedom of harmonic movement. Compositions did not have to begin and end with the same chord, nor did they have to adhere rigidly to one mode, Harmonies could move freely, the only requirement being that they should progress logically and interestingly.[15]

The desire of composers to modulate appears to have risen as an aesthetic need rather than as a mere technical process. Modulation is one of the most important resources for introducing variety into music. The development of the practice of modulation is indeed an interesting one for it is vitally interwoven in the history of tonality itself.

Up to the middle of the eighteenth century, composers rarely modulated outside the circle of related keys, but by the late eighteenth century, they began to modulate to more distant ones. During the nineteenth century, as interest in harmonic color grew, the techniques of modulation changed and many of the old practices were discarded. Abrupt modulations replaced the neatly prepared conditions of earlier times, dissonance lost its former meaning, and in reality, tonality eventually disintegrated with the many freedoms which composers took in modulation beginning in the late nineteenth century.

MAJOR VERSUS MINOR

The words major and minor are two terms used to distinguish scales, triads, or keys mainly according to their third--e.g. c - e in major and c - e^{b} in minor. During the seventeenth century, these two modes became the basis for European music. Prior to that time, Western music had been based on the church modes, several of which contained the small third now associated with the minor mode, therefore the minor sound was common.

However, only with the advent of Baroque music did the present contrast of major and minor assume universal importance.[16]

At that time the modes were being assigned their characteristic roles with the major coming out triumphant. Rameau, for example,

referred to the major mode as the "sovereign of harmony" and he regarded the minor as its satellite.[17]

Most of the eighteenth-century writers shared this same opinion. According to Rameau:

> The major scale, a direct shoot from nature, has a strength, a brilliancy, a virility, if I may use the expression, which prevails over the minor and makes it the acknowledged master of the harmony. The minor on the contrary, depending less on nature alone, receives from the art, of which it is partly formed, a weakness which characterizes its origin and its subordination.[18]

The same notion is sounded in the German school. Hauptmann traced the metaphysics of the two modes and using the terminology of Hegel, calls the minor key a "falsehood of the major." He further states that "it calls forth sadness like the drooping branches of the weeping willow."[19] Helmholtz, who for the series of harmonics gives only the major chord, does not hesitate to explain that the major mode serves to realize the beauty of music, while the minor is not only an alteration of true music, but a means of expression of the repulsion which it excites.[20] He continues:

> The major mode is suitable for all clear-cut sentiments, and also for sweetness, and even for sadness, if impregnated with a tender and enthusiastic impatience; but it does not at all suit somber, uneasy, inexplicable sentiments nor the expression of strangeness, of horror, of mystery or of mysticism, of savage harshness, nor of anything which contrasts with artistic beauty. It is precisely for all these that we need the minor key.[21]

Schopenhauer, in describing a scherzo composed in a minor key, said it made him think of a dancer in tight boots which hurt him. Hugo Riemann speaks of the "bitterness" of the minor mode.[22]

Eventually all these theories faced the fact that the minor has no affective significance, that it carries no sad connotations in non-Western music, in folk music, or in the music of the primitives. This tends to point out that like most musical responses, the one to the minor mode is not natural and it is not universal but learned.[23] Even after three centuries of the major-minor system, C.P. Heinlein found in a random sampling of twenty-five hundred compositions for beginners, only seven percent were in minor and almost all of them had descriptive titles which continued to inform young musicians that major is happy and minor is sad.[24] "It is," he writes, "a difficult matter to obtain a composition in the minor mode written for

children that does not have a little related to the wierd, the mysterious, the sad and the gloomy."[25]

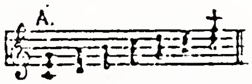
To fortify his thesis that this is a learned response, Heinlein discovered that only two out of thirty subjects could give an adequate explanation of the difference between major and minor chords.

"Feeling-tone" of the joyful melancholy dimension expressed in words, furnishes the terms by which technical designations are made respecting the variations in tone structure. Fixity of the feeling tone is a matter of training, since both trained and untrained objects may characterize minor compositions as being happy and major compositions as being sad.[26]

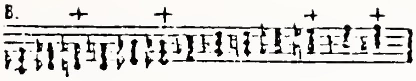
However, not all theoreticians agree with the cold facts as stated by Heinlein. Meyers claims:

> The interrelationship between affectivity, melodic and harmonic chromaticism, and the minow mode is not simply a theoretical or an accidental correspondence. It is a historical fact. The connection between them is not only a logical one but . . . a genetic one as well. The desire for even more expression brought about increased use of chromaticism; a trend away from constructivism toward free designs dependent upon the changing content of the text, and the suggestion of dramatic recitative. The minor mode is not only associated with intense feeling in general but with the delineation of sadness, suffering, and anguish in particular.[27]

The minor mode is both more "ambiguous" and less "stable" than major. It is more ambiguous because the repertory of possible vertical combinations is much greater in the three forms of minor therefore the probability of any particular progression is smaller. The tonic chord in the major mode can, with varying degrees of probability move to any one of six triads:



The tonic triad in the minor mode can move to any one of at least thirteen different triads, not counting the chromatically altered chords so common in minor.



Furthermore, in the major mode only one of the triads, the one built on the seventh degree is itself ambiguous while in the minor four such chords are possible (they are marked with + in the above examples).[28] Because of this unstable character of the mode slower tempi tend to accompany the chromaticism in the minor mode. "The minor mode as a total system lacks stability in that it tends to gravitate toward the key of the relative major. And this sign is perhaps a sign of the basic normality of the major mode."[29]

Major and minor modes are actually not as distinct in usage as their two scales would tend to indicate and it is sometimes uncertain which impresssion is intended by the composer. Fluctuation between major and minor has always been common as the parallel modes tend to be interchangeable, even with triads. With the passage of time, composers became increasingly bold in modulating and in fusing the parallel major and minor modes (Schubert). They used chords typical of one mode in the other, avoided strong tonal cadences, and veiled contours of phrases to give their music a less well-defined feeling of tonality. By the time of Schuman and Chopon, the minor mode and its relative major are often identified and considered as the same key, so that no polarity is any longer possible (Chopin's Scherzo in B^b Minor/D^b Major).

During the late nineteenth century (1860) a new spirit was felt in music which strongly influenced harmonic practices. Nationalism became an important force in the arts, especially in countries which had no great or unbroken musical tradition. The national movement started, as a reaction to the supremacy of German music. Apel calls it a movement of despair "started by talented musicians who found themselves faced with the necessity of competing with men like Beethoven, Wagner, Brahms, and who, in their national treasure of melodies, dances, etc., found a weapon with which they could hope successfully to wage the combat."[30] The development took place earliest in Russia where a group of five amateur musicians united to create an all-Russian style of music.[31] The fact that all of them were relatively ignorant of conventional harmony and counterpoint was a positive asset for it forced them to discover their own rules for writing music.

They used the materials nearest at hand--folk songs. Mussorgsky, the greatest of the Russian five, was also the one with the least knowledge of how to write music.

His individuality is apparent in every aspect of his music. Although he rarely quoted folk tunes, his music breathes the spirit of the Russian folk tunes. A prominent feature of the Russian song is its modal character, a feature which affected Mussorgsky's harmonic style. Unhampered by a knowledge of traditional harmony, he laboriously worked out, at the piano, his bold, new harmonies. His harmonic vocabulary, while seldom complex, conveys the precise effect he wished and frequently it defies analysis according to textbook rules.

Mussorgsky's highly original harmony was to have a great influence on late nineteenth-century and early twentieth-century composers. It was in fact, the Russians who introduced modality into the general musical language of Europe.

THE HISTORICAL CHANGE OF THE THIRD FROM DISSONANCE TO CONSONANCE

Sufficient grounds exist for the supposition that parallel thirds were used in singing on the European continent as early as the 12th century, have come from England.[32] The dulcis fistula of the Milanese Anonymous indicates that the third could have been in use as early as the 11th century. Guido of 'Arezzo also shows a preference for those modes which lend themselves to the introduction of thirds. These references of course are only symptoms of a gradually increasing awareness to the fact that by limiting themselves only to the consonances recognized by antiquity, musicians were in fact suppressing a natural musical instinct. There was, however, a long way to go before thirds were recognized as of equal importance with the medieval consonances.

It is not clear who first recognized thirds as "imperfect consonances," but according to general research, Franco of Cologne is regarded as the originator of the new theory of consonance. It is possible however that it was one of the early masters of more-than-two-voice settings mentioned in the musical-historical sketch of Anonymous IV. (Leoninus, Perotinus, Robert of Sabilon, Petrus de Cruce or Johannes Primarius).

In the mid-thirteenth century, Hieronymus de Moravia, in a treatise entitled Discantus positio vulgaris does not regard thirds as consonances, but suggests that they are no longer looked upon as really dissonant:[33]

> Consonance is the amalgamation of several voices singing the same or different notes. Of the concordances, three are better than the others, namely the unison, the fifth, and the octave. the remaining intervals are more dissonant than consonant, and are separately graded, inasmuch as the second (tonus) seems to be more dissonant than all other intervals.[34]

The English theorist, Walter Odington (c. 1290), was the first to actually recognize the third as a consonant interval.[35] His appraisal of thirds is quite unusual for his time but gives evidence of the discrepancy so often found between theory and practice. Odington indicates that the treatment of thirds as consonances had already been long established, at least in English practice.[36] In the fourteenth century the third was admitted as a consonant interval in actual composition (Gymel, Fauxbourdon) and by this admission the history of harmony changed radically. By the time Bartolome' Ramos (a Spanish music theorist born c. 1440 at Baeza) wrote his Musica practica at Bologna (1482) he declared the major and minor thirds consonant.[37]

The third has become the most characteristic interval in the Western system of harmony. In fact the history of harmony has been divided according to the use of the third. The period from c. 900 - 1500 is looked upon as the period of pre-tertain harmony in which the third was not yet fully admitted. The period from c. 1400 - 1900 is considered as the era of tertian harmony while the period of time from c. 1900 on is known as the post-tertain period in which the third lost its commanding position.[38]

Prior to 1500 the third was not usually admitted in the final chord. but in more recent times, a chord did not seem complete at the end of a composition unless it contained a third.

Medieval musicians considered the third as dissonant in the final chord until the art had undergone some five centuries of development. To them the relative roughness had the same effect that a discord did to musicians of the eighteenth and early nineteenth centuries who felt something more was needed if the final chord lacked a third. In medieval times musicians felt something more was needed if they heard a third in the concluding chord.[39] This reaction is a learned reaction according to Farnsworth who concludes:

> . . . ending preferences may be permanently altered by training. An increasing familiarity with a ratio symbol-ending leads to increasing preferences for that specific ending.[40]

With the acceptance of the third in the cadence, music entered the era of tertain harmony with its concerns for the harmonic progression of chords which led to the final establishment of major-minor tonality in all keys.

DEVELOPMENT OF CADENCES

Cadences have always played an important role in the language of music. They are a major consideration in the analysis of style, they mark breathing places in the music, establish tonality, and render the formal structure coherent. The word cadence itself means to fall and the tendency to fall on the last word in a sentence in speaking is well known. Because most of

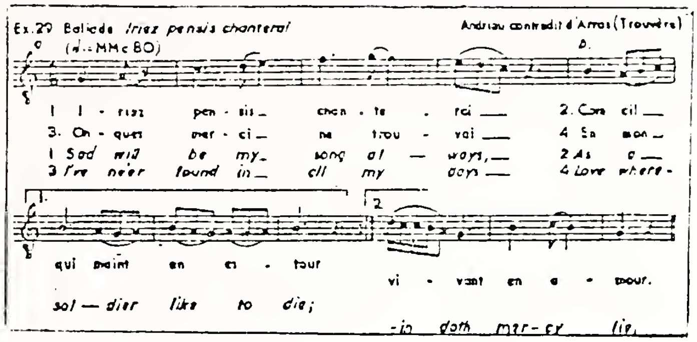
the natural cadences of the speaking voice tend to fall, in melodic musical systems, the majority of the cadences move downward. When a person raises his voice, it is usually to ask a question or express surprise--both of which are used less frequently than other expressions of feeling. Pure vocal art, following the inflections of normal speech, is so influenced by the voice that cadences which rise to the final are less common.[41]

During each period of music, there have existed a rather limited number of cadential formulae, of which most all closing passages are but modifications. "The classification and terminology in this field are lacking in uniformity and frequently also in clarity."[42] As different styles in music have evolved, new cadential treatments have developed. The changing treatment of the cadence has played a vital role in the gradual dissolution of the modal system and the rise of tonality. Cadences gradually ceased to be basically a melodic consideration but became a harmonic process as well. While they continued to be important as artistic punctuation of melodic phrases, they also took on another equally important function--that of defining the key of the cadence by giving a feeling of finality (or the opposite). This key defining role is not so strongly felt in music before 1630 because in the modes the final did not exert the strong pull on the other scale tones as did the major/minor tonic.[43]

Probably the most significant single factor in standardizing vertical combinations was the cadence. As early as the late thirteenth century, rules for its use appeared in the writings of Anonymous IV where he stated a rule governing two voices in which the penultimate interval was to be either a major sixth leading to the octave final or a minor third leading to the unison.[44]

Cadences in monophonic music served the same basic purpose as they do in polyphonic or harmonic music--that of giving either momentary of permanent conclusion. The ouvert and clos cadences used by the troubadour, Andrieu contredit d' Arras (c. 1180-1248) in the following ballade correspond favorably with the later imperfect and perfect cadences. The "open" cadence ends on any note except the final, while the "closed" cadence rounds off the section by closing on the final.[45]

EX. I. Ballade by Andrieu contredit d' Arras (first section).[46]


Ex.29 Ballade Irrez pensis chanterai
Andrieu contredit d'Arras (Trouvère)
(♩.=MMc 80)
1 I - riez pen - sis chan - te - rai
2. Con cil
3. On - ques mer - ci ne trou - vai
4 Sa mon
1 Sad will be my song al - ways,
2 As a
3 I've never found in - all my days,
4 Love where -
1. qui maint en a - tour
2 vi - vant en a - mour.
sol - dier like to die;
-in doth mer - cy lie.

In the fourteenth century, as composers were beginning to accept thirds and sixths as concords in their own right, and to prefer the leading-tone-to-tonic progression, several rules concerning their use were formulated such as:

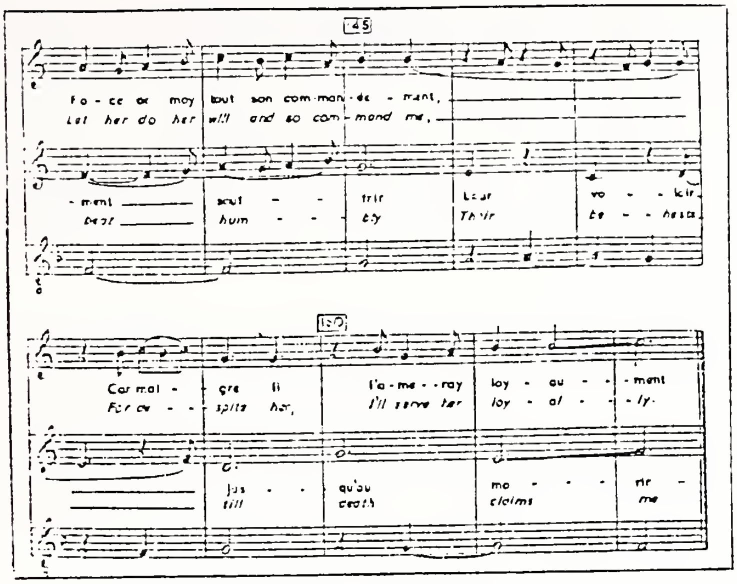
1. A third and sixth expanded stepwise to a fifth and octave respectively should be major.

2. A third contracting to a unison should be minor.

3. A fifth and octave must be perfect; if the above intervals are not naturally major, minor, or perfect they must be rendered so by chromatic alteration.[47]

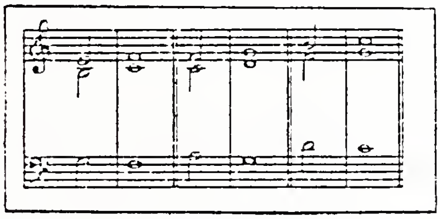
In medieval polyphony a cadence or a close was a polyphonic problem which involved the harnessing of the individual parts, each of which has to be guided to the desired end without loss of the distinction of the part yet staying within the defined convention of the particular mode in use. A type of cadence in which both the final and the dominant were approached by a leading note was characteristic of much late medieval and early renaissance music. It is frequently, but unfortunately called the "Burgundian" cadence. Unfortunate because "Burgundian" also refers to a group of mid-fifteenth century composers, whereas the cadence was already commonly used during Machaut's time. A better name is "double leading-note cadence."[48]

Ex. II. Double leading-note cadence in Machaut's motet-De bon espair-Puis qui la douce-Sperani.[49]


145
Fo - ce ce moy tout son com-man-de - ment,
Let her do her will and so com - mand me,
- ment scul - - trir Leur vo - - loir
best hum - - ly Their be - - hests
150
Car mal - gre li l'a - me - - ray loy - au - - - ment
For de - - spite her, I'll serve her loy - al - - - ly.
jus - - qu'au mo - - - rir
till death claims me

Some time after 1250 cadences started to be written in the following forms which remained standard for the next two centuries:

Ex. III. Cadence forms.[50]



Another favored cadence of fourteenth century composers was the "under third" cadence. Its identifying mark was a skip from the note a third under the finalis directly to that note at the cadence (6-8) instead of a degreewise motion through the leading tone (6-7-8). Most of the harmonic cadences until the middle of the fifteenth century involved the degreewise outward motion form a sixth to an octave of two finals. The under third melodic cadence when used in harmonic motion, acted as an embellishment[51]

Along with the older type cadences (Burgundian and Landini) a new form appeared in the fifteenth century which was in effect a dominant-tonic progression and which in three part writing nearly always found the two lower voices crossing. Notice the contra tenor leaps up an octave to the fifth of the chord, while the tenor continues its downward progression from 2 - 1. This cadence is also interesting because it foreshadows the authentic cadence with its 5 - 1 in the lowest part.

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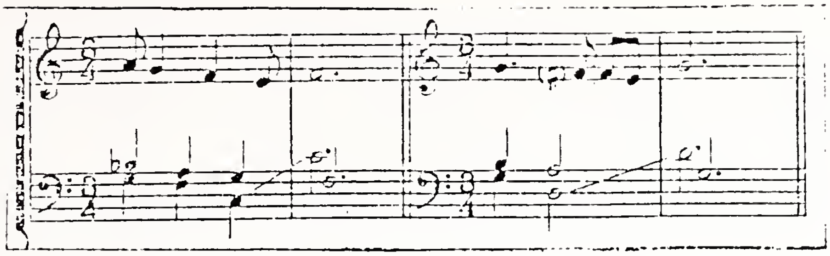
Ex. IV. Typical octave leap and V - I cadences.[52]



The feeling for chord progressions of this character became more marked, and after 1460 the normal cadence was one which could be designated in modern terminology as V - I. However, the composers of that time did not think of them as such, at least not with the present implications. Music theorists did not recognize the triad as an entity, still less any tonal-functional chord progressions until well into the sixteenth century. Their unit continued to be the interval between a pair of voices, not the chord.

The probable reason why the perfect authentic cadence gained in popularity and finally replaced the medieval ones is that the composers realized that if the lowest note or root of the final chord was approached by a leap it would stand out more clearly and hence the whole chord would be more sharply defined and the dominant note was the only one which sounded well with the other two, i.e. the leading-note and the supertonic.[53]

Prior to 1500, the final chord was almost always without the third, in fact the first half of the century the inclusion of the third in the tonic chord was present in only three percent of all compositions. By the latter half, it was present in thirty-nine percent of all final chords.[54] When it was used, the major variety was preferred, probably because, from the contemporary theoretical view, it was more consonant than the minor. This practice, known as the Picardy Third, continued to be used well into the Baroque and to a limited extent beyond.

The earliest known cadence fulfilling all the requirements of what is now known as a "perfect" cadence--even to the inclusion of a third in the final chord is found in Machaut's ballade, _Il m'est avis_ from the fourteenth century.[55] A cadence is perfect if it can satisfactorily and normally be used to close a composition. According to the rules of classical harmony, this requires a tonic note in the bass and soprano. The penultimate chord can be either the dominant or the sub-dominant. All remaining cadences fall into two classes--imperfect and deceptive cadences.

At one time it was fairly common to close a minor composition with a major chord, a progression called the Picardy Third (_tierce de picardie_). This practice was followed well into the

Baroque period, J.S. Bach used it, but after his time it gradually disappeared.

THE PICARDY THIRD

The term "Picardy Third" (Tierce de Picardie) designates the major chord ending a composition which is otherwise basically in a minor key, or in any mode in which the third above the final or tonic is a minor third.[56] This effect was common from the beginning of harmonic composition (about 1000) to the mid-eighteenth century, a period of over seven hundred years.[57] Before the sixteenth century, a final chord almost invariably had no third so it as not extensively used until about 1550. The earliest recorded use of the term is in Jean Jacques Rousseau's music dictionary published in 1764.[58] The practice tended to diminish during the late sixteenth century and by the middle of the eighteenth century it had nearly vanished. Bach sometimes used it and sometimes did not. After his time it was still found, but with less and less frequency.

Several theories are promoted as to why composers used this curious ending. All have a certain amount of credence, but none is conclusive. The name, the origin of which is obscure, is thought to have been used because the custom is said to have originated in Picardy.[59] Rousseau, in his dictionary suggests rather unconvincingly: "Tierce de Picardy because this way of ending survived longest in church music, and thus in Picardy, where there is music in a great number of cathedrals and other churches."[60] This particular explanation continued to be used in other works of reference, sometimes word for word, for fifty years or more. Percy Scholes believes that the name probably had to do with the high development of contrapuntal chordal music in Northern France and Flanders during the fifteenth century.[61]

Harmonic considerations have also been promoted as the reason for the existence of the Picardy Third. In the music of the sixteenth, seventeenth, and early eighteenth centuries, the major triad was considered more consonant than the minor, hence it iscommon to find the final tonic triad in a minor key altered to be a major triad.[62] Charles Rosen substantiates this by saying, "The minor mode is essentially unstable, which is why pieces in the minor tend to have endings in major."[63]

One interesting observation has to do with the manner of tuning of instruments. In just tonation, which was used up to the end of the eighteenth century, it was found that the overtones produced by a note, especially when doubled at the octave, were so strong in cathedrals and other echoing places that the harmonic major 10th could be distinctly heard, therefore it was disagreeable to hear a composition end on a minor chord. When the same chord with the third changed to major was sounded, a chord of supernatural brilliancy was heard.[64] Corder goes on explain that this was the reason why Handel ended some of his organ concertos with a bare fifth using no third at all, trusting nature to supply one of better quality than he could.[65]

Somewhat related to the theory just described was the idea that it was unsuitable to bring changing harmonies to rest on the interval of a minor third because keen ears could detect the major third occurring as one of the harmonics of the keynote. There are relatively few people today who claim to do this. Scholes is inclined to believe the practice was initiated by stern theorists, perpetuated by the practice of musica ficta, and it eventually became a convention.[66]

The practice became pronounced c. 1500, when the third was admitted in the final chord of a piece. The extent to which it was used before 1550 is difficult to ascertain, this being related to the problem of musica ficta. An early example is found in Tromboncino's (fl. 1500) Frottola, "Non val aqua" (HAM No. 95). By the second half of the sixteenth century, the practice had become relatively common. In his Musica nova (1559) Willaert included the major third in all cadences, plagal as well as authentic.[67] The "Picardesque" composers of the fifteenth and sixteenth centuries reflected the reaction of the theorists who treated the minor chord as a dissonance. It is interesting to note how the creative musicians dealt with the problem. Although they treated the minor keys as they did the major ones, they bowed to the theorists by using the major in the final chord. Eventually the two types of triads received complete aesthetic equality and when that took place the need for the Picardy Third passed. Otto Ortmann has correctly observed that "the present time shows signs of accepting other, more complex chords, as complete consonances, and the future will record the passage of subjective consonance to yet higher ratios."[68]

There had been attempts to establish the system of equal temperament in the sixteenth century where it was essential to some of the chromatic music written then, but it did not become the theoretical basis for music composition until the eighteenth century. It was not until then with the full establishment of equal temperament, that the possibilities of modulation could be fully articulated, the consequences of which were only fully realized in the latter half of that century.[69]

While the definition of late eighteenth century tonality by the circle of fifths may appear more cumbersome than one based on major and minor scales, it does have the advantage of emphasizing that the center of a tonal work is a triad rather than a single note.[70] Scales would imply a system which is modal, not tonal; one in which the center is a note where each work is restricted to the notes of its mode and the final cadences are conceived as melodic rather than harmonic formulas. The minor considered unstable (which is one reason why pieces in minor tend to major endings), was used as a chromatic device--a way of adding color to the major. Major/minor did not clearly define a movement to another tonality but was merely considered an expressive coloring of the same key.

By the time of Haydn, Mozart, and Beethoven, tonality with the full implications of the hierarchical arrangement of triad was well established.

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All of their works are written with the system of tonality and equal temperament in mind.[71]

The above discussion may appear to deviate from the topic of the Picardy Third, however in reality it is necessary in order to understand how Classical composers dealt with music, both psychologically and practically. Music had to be appreciated by patrons, and composers experimented for new and novel ways to appeal to their rather small, but well-versed audiences. Because music was and still is affected by the social and intellectual climate, creative artists never allow the art to remain static.

In music this fact is prominently attested to by the way tonality has been treated. No sooner had it become an established fact than composers looked for ways to alter it.

During the nineteenth century, romantic composers interchanged the two modes so freely that it was sometimes difficult to determine the key of a composition (Schubert). By the time of Schumann and Chopin, the minor mode and its relative major are often identified, considered the same key, so that no polarity is possible (Fantasy in F Minor/A flat major). Some composers continued to employ the functional harmony of the tonal system with only a small amount of chromaticism, however the end of the nineteenth century, the increased use of the unstable harmony of chromaticism affected the music of most composers. The development of chromatic harmony is, in fact, one of the outstanding achievements of that century, The departure from diatonic harmony into the possibilities of chromaticism had two effects: distortion and ambiguity. Romantic distortion consisted of the chromatic alteration of one or more notes of diatonic triads and 7th chords until their functional, key-defining role was weakened, even destroyed. The more chromaticism which appeared in a passage, the more closely the scale being used approached the twelve-tone chromatic scale which does not possess a tonic or keynote.[72]

Cadences and modulation also became distorted with the Romantic desire for continuity. During the seventeenth and eighteenth centuries, cadences had been pillars of tonality; in the nineteenth, they were frequently deceptive resolving ambiguously on a chromatically altered chord rather than a diatonic, functional one. Modulation was implied at phrase endings rather than at crucial points in the structure. Sometimes it occurred so frequently that all sense of key and structure were confused or even lost.

These facts of music history reveal the reasons for the appearance, use, and disappearance of the Picardy Third. When the minor was viewed as an unstable mode, the major-third ending satisfied the feeling of finality demanded by the theorists. Eventually, as the two modes achieved aesthetic equality, the minor triad served as its own ending chord. With chromaticism both modes lost their individuality to the ambiguity of the chromatic scale and the chord of either could serve as a final. Thus the Picardy Third lost its reason for existence and faded from use. Percy Scholes, who aptly described this charming facet

of music, called it a pleasant effect, "as of a bright ray breaking through the clouds as the sun sinks."[73] Although it continues to be found occasionally, its effect has been impaired by the harmonic practices which caused its demise.

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4. Miller, *op. cit.*, p. 34.

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11. Ibid., p. 55.

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44. Robert Wienpahl, "The Evolutionary Significance of 15th Century Cadential Formulae," *Journal of Music,* (Vol. II/2, Nov. 1960), p. 132.

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SOME ASPECTS OF THE PORTUGUESE CONQUEST OF ANGOLA

Emmanuel Saunders

In this short study, an attempt would be made to investigate the extent of the Portuguese influence in the backlands of Angola, and how this influence was used in Portugal imperialistic designs in the region. Somehow the Portuguese seem to follow a pattern of fraternizing with the indigenous peoples in order to establish colonies in their non-white areas of their empire. Was this a kind of national characteristic, or was it political pragmatism on the part of Portugal whose population was too small to send large numbers of settlers throughout her vast empire? Answers to these and other questions would be sought for in this brief analysis of Portuguese colonial conquest in Africa.

Up until the European scramble for Africa in the late nineteenth century, the Congo and Angola were considered one geographic and political region. These regions were but vaguely defined; the old kingdom of the Congo may be taken as the region bounded on the North by the River Zaire (or Congo), on the south by the river Dande, on the west by the sea, and by the river Kwango on the east.

Angola may be taken as the area between the Dande and Longo rivers, with the hinterland stretching several miles into the interior. Its native name was Ndongo; the Portuguese called it Angola, from the name or title of its ruler (Ngola) when they first visited it. Its chief originally owed allegiance to the King of the Congo, whose sovereignty was shaken off about the middle of the sixteenth century. In 1483 the Portuguese landed at the mouth of the Congo river thus opening a new chapter in the history of these western kingdoms. Apart from soldiers some of the early settlers were priests and friars, skilled workers and artisans. A few white women were also sent to teach the local women the art of Portuguese domestic practices.[1]

Unlike the other Portuguese colonies, the conquest of Angola had always posed a serious problem to the Portuguese. This was particularly true for the first century or so when Portugal tried to colonize Angola. But even today an active struggle is still in progress; the indigenous peoples of the area continue to resist alien influence, now against the Soviet Union, with the help of the Reagan administration. For decades the white population of Angola had never reached the proportions similar to that of Brazil or some of the other Asian colonies of Portugal. There is a most important reason for the sparseness of the white population, which has traditionally been overlooked by many historians. This was due to the fact that the indigenous people of Angola had waged a relentless struggle against the Portuguese

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intruders. In 1688, the Overseas Councilors at Lisbon is reported to have said that the Negroes of Angola "loathed our rule and fervently desired to throw us out of the conquest...only out of fear and respect for our arms did they allow the preaching of the gospel and the admission of our traders."[2] A few years before (1625) Severim de Faria, a Portuguese official in the colony, was forced to admit that the conquest of Angola was no easy task when he wrote: "There has been nothing but fighting from the beginning of the conquest till now and very little has been done for the conversion of the inhabitants of the great province."[3] Conversion or not, black resistance seriously impacted on the Portuguese ability to expand in the early years of their conquest of Angola.

There were, of course, other reasons for the limited number of white settlers in Angola, particularly in the interior. For example, tropical diseases and the small population of Portugal prevented a greater concentration of white settlers in Angola. However, David Birmingham contends that more Portuguese were lost to wars against the native population than by fever and other causes.[4]

The Portuguese first real attempt at conquest and settlement was led by Paulo Dias in 1575. When war broke out in 1579, Dias had only about sixty Europeans so he recruited more than two hundred Angolans who assisted in the founding of the colony of Luanda, which later became the capital of the colony. The early settlers in Angola were essentially soldiers. Later, and up until the twentieth century, most of the whites consisted of transportable criminals, political exiles (degradados) and incorrigible military personnel. While the initial reason for the conquest of Angola was to create a colony for Europeans similar to the Brazilian experience, Angola was also seriously considered a colony for mineral exploration as Spain was doing in her American colonies. In the end and driven by pecuniary motives, the slave trade eventually became the raison d' etre for the Portuguese presence in Angola. At this time the other European nations were content to explore the periphery of West Africa in search of slaves, on the other hand, Portugal was bent on digging in. With this conscious attempt at settling in, there was bound to be a greater degree of interaction between the Portuguese and the indigneous peoples - more so than the English or the Dutch in Africa.[5]

For many years the Portuguese settlers had to remain on the outskirts of the colony at Luanda. Their failure to explore the interior in significant numbers remains one of the success stories of Africans' resistance to Europeans expansion in Africa. "Outside Luanda," writes Ehnmark, "there had been in the 1840's no more than 300 Portuguese in the entire colony. This was approximately 265 years after the arrival of Paulo Dias. The majority lived near the coast."[6] After 1575, the Portuguese were preoccupied with extending their influence into the backlands. Some of the early pioneers were the soldiers of Paulo Dias. According to Jan Vansina, in 1627 Lopo Soares Lasso arrived in the colony to continue the search for mineral but his

search was unsuccessful. Undaunted, he somehow "pacified" the town of Benguela thus making it easier for the Portuguese to penetrate further into the interior. Three years later (1630) an envoy who was sent to the upper Cunene area remained, where he settled and married, thus becoming the first sertanego or "backwoods man" on record.[7] These settlers or sertanegos "led a life of opulence and almost complete independence", writes Vansina.

When Innocencia de Sousa Coutinho, a goverment official, saw that the sertanejos of the highlands of Benguela were escaping government control, he created "bush jurisdictions for them and appointed one of them as a captain major in every major area of concentration."[8] Many of these married local women thus creating a class of mulattoes who became the principal intermediary between the peoples of the back country and the Portuguese on the coast. These "half-castes" or pardos were to become the backbone of the colonial militia and administration. A few rose to prominent positions like Louis Lopez de Sequeira who was in command of the Portuguese forces which defeated and killed King Dom Antonio I, of the Congo in the battle of Ambuila (1685). Many fought without shoes.[9] These sertanejos were rather color blind in terms of their sexual relationships. "There is a high birthrate caused by the infantry solders and other individuals among black ladies, for want of white ladies which produces many mulattoes and coloreds,"[10] wrote the Chronicler Antonio de Oliveira de Cadornega at Luanda in 1682.

But did the Portuguese possess a greater affinity for socializing with non-whites than other Europeans? The noted Brazilan historian and sociologist, Gilberto Fryre, has suggested that the Portuguese were a people who for centuries were subjected to the dominance of the "dark skinned" Moors who were superior to the white race in various aspects of moral and material culture and though they themselves might have been of a profound blond type they had long since formed the habit of discovering in colored peoples human beings who were brothers and with whom it was possible to fraternize. "It was this habit," he emphasized, "that led the Portuguese to readily adopt the foodstuff, standard of feminine beauty, and modes of life of peoples that by other Europeans were looked upon as being inferior."[11] Freyre con-tinued to reinforce his thesis by pointing out that in some of the best Portuguese families there are Jewish, Morish, and Indian blood. "Yet this did not distract from the prestige of the family."[12]

Charles Boxer, on the other hand, expressed a contrasting point of view with respect to the Portuguese attitude towards non-whites, and Africans particularly. He emphasized that for the most part, the Portuguese acted like their European counterpart. Many of them did mate freely with Africans whether bond or free because of the extreme scarcity of white women. But it should not follow from this willingness to mate with African women that the Portuguese lacked color or race prejudice as is often asserted by modern apologist of the Portuguese racial attitudes. There were, of course, some exceptions; but as he stressed, the

prevailing social pattern was one of "conscious white superiority."[13]

The few whites who did settle in the backlands of Angola saw the pragmatism of identifying with their cultural environment. Several traders and their descendants who lived among the "bush" people out in the villages became "Africanized," they went "completely" native stripping off their clothes, tattoing their bodies, and speaking the local languages and even joining in "fetish" rites and celebrations. These were referred to as tango-maos or lancados. Some acquired special standing in the eyes of many Negro rulers and their people, some were able to marry into ruling families while others made advantageous agreements with local chiefs.[14]

In describing the lives of these "fortune hunters" in the interior beyond the presidios (Portuguese outposts) it was stated that they lived in "barbaric splendor in the bush with natives wives dressed up like Oriental Potentates." These backwoods-men were often instrumental in creating a closer and more friendly relationship between the distant villages and Luanda, the capital on the coast. They were especially active in the slave trade. By the beginning of the sixteenth century the search for minerals had given way to the trade in "black gold," the slave trade.

The bulk of the trade and econimic activities in Angola was in the nature of the slave trade. Most slaves came from the regions beyond the presidios where few whites venture. In such areas, it was suggested that there was neither police, charity, no fear of God or any human loyalty. Even natural law was unknown. "These frontiersmen were impelled by the hope that their gamble would pay rich dividends. They did their evil trade in the face of grave danger and hardship, but they were content to endure any setbacks because the profits from the slave trade were enormous. Slaves who were sold for a few squares of palm cloth in Angola fetched from four to six pesos in Peru according to age and condition."[15] Boxer writes:

> Slaves were obtained by the Portuguese in various ways; by war, by tribute or by barter. Under normal peaceful conditions slave agents called pombeiros or pumbeiros (from a native word meaning 'hawker') roamed the interior regions purchasing slaves from local chieftains...for transportation to Brazil. The pombeiros were mulattoes or pure Negroes who would be sent out by their Portuguese masters at Luanda with any thing up to a total of a hundred and fifty Negro slaves as carriers to transport the palm-cloth, cowries, wine and other merchandise for which slaves were purchased in the interior. These Pombeiros would stay away from one to two years before either sending or bringing back to the coast, chain gangs of five to six hundred slaves.... Some of the most trusted pombeiros did not return to Luanda for years on end but stayed up-country.[16]

Angolan slaves were mainly sent to the sugar and coffee plantations of Brazil where they formed the mainstay of the labor force. However, plantation labor was not the only way in which these slaves were utilized. Many slaves from the backlands areas were recruited into the Portuguese militia. For instance, the Jagas who were perennial obstacles in the path of the Portuguese expansion in Angola gradually became their allies. Boxer again pointed out that, "it was hordes of this type" which formed the infrastructure of a native auxiliary or guerra preta (black war). So the Portuguese were able to conduct their campaigns in the backlands with a few hundred Europeans and mulatto soldiers, accompanied by the guerra preta of several native auxiliary and carriers.[17] Not only were these "slave" troops invaluable to Portugal in subduing the back country of Angola, they also served Portugal in the conquest of other colonies as far as Asia.

In 1651, the governor of Macao wrote the Viceroy of Goa with respect to the reinforcement for the tiny garrison there. He pleaded with him to send "Negro slaves who were tough and bellicose."[18] With-out doubt Portugal's colonial expansion was directly proportional to the use of slave troops, with Angola being the primary supplier. Writing in 1539, Joao de Barros extolled the courage and loyalties of the Negro slaves. He urged his countrymen to employ them on the scale that the Moors of Barbary did. "They are so brave," he wrote, "with them we have conquered the other regions which we hold."[19]

Approximately a century and a half later, when the Dutch suffered a disastrous setback in attacking Macao, one of their leaders candidly ascribed their defeat to the prowess of the defending Negro slaves. He referred to the Portuguese slaves as being "fearless against our muskets which was a wondrous thing to see." He also emphasized that the Portuguese were extremely stringent with the use of their soldiers. "They beat us off from Macao with their slaves. It was not done with any soldiers for there were none in Macao. See how the enemy thus holds holds his possessions so cheaply while we squander ourselves."[20]

These were the remarks of the Dutch officer. Because of such a great dependence on its slaves, the Crown of Portugal in 1684 issued a decree which stated that no distinction was to be made when recruiting blacks, whites or mulattoes for the military.[21] Since the greater number of slaves came from the interior it was not long before the traditional political systems there were completely disrupted by a very small a number of whites. The cooperation of African leaders must not be overlooked in terms of the part they played in the slave trade and the eventual destruction of their own states. But again these alliances that the leaders formed with Portuguese were neither unique nor peculiar to Angolan political rulers. Very often chiefs joined with the Portuguese to fight against local enemies with the hope of preserving their power. In so doing, Portugal easily exploited these tribal rivalries and the fragmentary nature of the political system for its own ends. This common policy of divide and rule was widely practised by the European nations in their partitioning and exploitation of of the African continent.

By the end of the eighteenth century the majority of white settlers were either degredados or their descendants; many of whom had come from Brazil. However, a large percentage was always able to get back to Brazil which further kept the white settler population in Angola extremely small. Very often the authorities at Angola were unaware of the return of these exiled criminals which provoked several Brazilian Governors to complain that convicts who were deported to Angola were finding their way back to Brazil, with or without the knowledge of the authorities at Luanda. By the same token, the governors of Angola and the Camara or council of Luanda occasionally protested against Angola becoming a penal colony for both Portugal and Brazil.[22]

Any society structured along such unsavory elements like criminals and the likes would not only be promiscuous but irresponsible, especially in the bush country so far removed from governmental authority. In fact from as early as 1662, the municipal councilors at Luanda made a strong appeal to Lisbon against the use of convicts in "official posts." Instead they suggested that "they be sent forthwith to serve their sentences in the interior"[23] In fact even the white women who were sent to Angola were social misfits like their male counterparts. The Portuguese Crown used to send out to the colonies small parties of women either orphan girls or reclaimed prostitutes as it did in India and Brazil. But then these were always too small in number and they were seldom sent into the interior. In fact in 1864, the Camara of Luanda asked the Portuguese government to stop sending any more white girls or women to be married in Luanda since there was a surplus in the capital of the colony.[24] Whether there were enough white women or not, native women were readily available to the Portuguese who conveniently established commom-law relationship with them. This seemed to have been a universal pattern of the Portuguese Colonial policy; a policy of, "if you cannot win them then join them." Evidences of this prtagmatic approach can still be seen in both Angola and Brazil today where there is a considerably large mixed population.

In the back country where white settlers did not venture in large numbers, the practice of assimilation assured them a place in the village community. There they made some positive contributions like the introduction of New World plants. For example, maize, manioc, ground nuts (peanuts) and peppers. Manioc cultivation started in Angola after 1600, and by 1835 it was cultivated by the Lamba of Northern Rhodesia.[25] In addition, important trade routes were established.

One of the oldest trade routes in Angola led from Luanda to San Salvador. About 1650, a number of traders went to live in Kassange the capital of the kingdom of Imbangala near the Upper Kwango. Apparently, these traders helped to stimulate a greater taste for long distance trade in the interior. Whenever possible these traders found it expedient to merge with the indigenous peoples in the back areas so that they were able to communicate certain concepts of caravan trade where they settled. By 1880 the whole of Central Africa, south of the tropical forests had developed a systematic pattern of trade routes.[26]

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Vansina explains that it was these defined trade routes that later explorers to the interior of Africa followed, and which were so instrumental in the making of future colonial empires[27] and the eventual destruction of African civilization.

CONCLUSION

The Portuguese, from the beginning of the conquest of Angola (1575) were unable to make any significant gains into the back country. Here, it was the continued resistance of the Africans which prevented the early exploitation of Angola's interior. But in spite of the limited numbers of white settlers in the colonies, they were able to conduct a vicious slave trade with the collaboration of certain local leaders to the detriment of Angola's independence. According to C. R. Boxer, "the concentration of virtually all efforts on the slave trade by Portugal stultified the healthy development of Angola." With the slave trade as an entering wedge, settlers, traders, degredados and their mulatto descendants were able to infiltrate the interior in small numbers. These Portuguese frontiermen quickly adapted to their African environment by marring, concubinage, and adopting other back-country traits. In spite of this apparent ability to fraternize with the local peoples, only a few whites were allowed to remain in the backlands. Although the Portuguese demonstrated a great affinity for identifying with Africans, this fact must not be mistaken for a lack of race prejudice or lack of white superiority. The characteristic of fraternizing was anything but a means to an end, in the conquest of Angola. Perhaps the only positive good which came out of the Portuguese presence in Angola was the introduction of new food crops from the Americas and the opening of long distance trade routes. In the final analysis it could be said that these few settlers were able to derive optimum material results to Portugal at the expense of Angola's long term development.

ENDNOTES

1. Charles R. Boxer, Race Relations in the Portuguese Colonial Empire. (Oxford, 1963) p. 37.

2. Ibid.

3. Ibid. p. 25

4. David Birmingham, The Portuguese Conquest of Angola (London, 1965), p. 2

5. Ibid. p. 15

6. Anders Ehnmark, and P. Watsberg. Angoal and Mozambique (London, 1963), p. 68

7. Jan Vansina Kingdoms of the Savana (Madison, Wisconson: 1966) p. 138

8. Charles R. Boxer. Race Relations in the Portuguese Colonial Empire (Oxford, 1963)

9. Charles R. Boxer. The Portuguese Seaborne Empire (New York, 1969), p. 314-15

10. Gilberto Freyre. Masters and the Slaves (New York: 1946), p. 13

11. Ibid.

12. Charles R. Boxer. Race Relations p. 40

13. Ibid. p. 9-10

14. Charles R. Boxer, Salvador de Sa and the Struggle for Brazil and Angola (London: 1952), p. 225

15. Ibid. p. 220

16. Charles R. Boxer. Race Relations p. 25

17. Charles R. Boxer. The Portuguese Seaborne Empire p. 132

18. Ibid. p. 302

19. Ibid.

20. Charles R. Boxer. Portuguese Society in the Tropics (Madison, Wisconsin, 1965), p. 134

21. Ibid. p. 119

22. Ibid p. 118

23. Ibid. p. 129

24. Robert Collins, (ed) Problems in African History (Englewood Cliffs, N.J., 1968) p. 325

25. Ibid. p. 321-323

26. Ibid. p. 328

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